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## CONTENTS

	PAGE
Editorials .. .. .	983
Letters to the Editor .. .. .	988
Publications Received .. .. .	990
The Scrap Heap .. .. .	991
Overseas Railway Affairs .. .. .	992
The Evolution of the Distant Signal .. .. .	995
Carriage Ventilation on the L.M.S.R. .. .. .	996
New 2-8-2 + 2-8-4 Beyer-Garratt Locomotive for South Africa .. .. .	997
Mobile Permanent-Way Gangs in India .. .. .	1004

## ELECTRIC RAILWAY TRACTION

*A Supplement illustrating and describing developments in Electric Railway Traction is presented with every copy of this week's issue*

## Railway Stockholders and the "Square Deal"

FROM the current issue of *The Railway Stockholder* it appears that many stockholders are asking what they can do to help the railways at the present time, and the reply is given in an editorial which recommends that every railway stockholder should write to his Member of Parliament without delay urging him to support the companies, and pointing out that there are many grounds upon which this application can be pressed; for instance, it is possible to point to the hard lot of the stockholder. Another suggestion, which perhaps may command more widespread sympathy, is to attract attention to the great volume of employment for which the railways are responsible, and the diminution of which would result in considerable hardship. The editorial evinces a note of optimism in expressing belief that "the House of Commons will show, not for the first time, that in a democratic country swift action can be taken where swift action is needed." Naturally the December issue of *The Railway Stockholder* is devoted in the main to the "Square Deal" campaign, and it has been so compiled that this number should prove a useful source of reference to the members of the British Railway Stockholders Union Limited. Thus it sets out in full the official statement of what the railway companies ask and why they are asking it (cleverly in juxtaposition to the tribute from the Minister of Transport on the excellent work of the railways during the September crisis). Then a selection is included of the comments of some of the leading daily newspapers regarding the railway position,

and here the contrast is provided by following these extracts with an account of a debate in the House of Commons on November 16 concerning the continued high rate of road accidents. In view of the keynote to this issue of *The Railway Stockholder*, it is interesting to see also the announcement of the resignation as from December 31, of Mr. Ashley Brown, the General Secretary of the union and Editor of *The Railway Stockholder* and its predecessor, *The Railowner*, who has found it necessary to resign these posts for personal reasons. The official statement says: "In conveying his resignation to the executive committee, Mr. Ashley Brown alluded to the fact that since the formation of the union there had not been any difference of opinion upon any important question between the Chairman, the executive committee, and himself. It was with the very greatest regret that he relinquished his post." We wonder what reason has induced Mr. Ashley Brown to resign at the present juncture when all are pulling their weight for a common object.

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## New L.N.E.R. Superannuation Scheme

We publish on page 1008 a summary of the provisions of the new superannuation arrangements which have been completed by the L.N.E.R. for the consolidation of the superannuation funds of the constituent companies. Negotiations on the matter have been proceeding for some considerable time, and the stage has now been reached when the company will seek from Parliament the necessary powers to bring the new arrangements into operation. It is intended that the existing superannuation funds, so far as they apply to salaried staff employed by the company, shall be merged into one fund, together with the provisional scheme which has existed for some years. Certain supervisory and clerical staff hitherto excluded from existing schemes will be permitted to enter the new consolidated scheme, membership of which will be compulsory, subject to specified conditions, for all new entrants to the company's salaried service. All members of existing funds will be required to pay an increased contribution, and all superannuation payments will, in future, be made from the new fund. The benefits will consist not only of an annuity but the payment of a capital sum and, in this respect, the L.N.E.R. scheme is somewhat akin to the schemes of the L.M.S.R. and Southern Companies which Parliament approved some years ago. In particular, the proposed scheme covers not only male, but female staff, who are eligible for membership of the L.M.S.R. and Southern Railway funds.

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## The Week's Traffics

Traffics of the four main-line railways for the past week show a combined decrease of £319,000 in comparison with the corresponding week in 1937, following a decline of £300,000. Total decrease is 4.08 per cent.

	48th Week				Year to date	
	Pass., &c.	Goods, &c.	Coal, &c.	Total	Inc. or Dec.	%
L.M.S.R. ..	8,000	98,000	32,000	138,000	2,818,000	-4.60
L.N.E.R. ..	11,000	91,000	30,000	132,000	2,121,000	-4.73
G.W.R. ..	4,000	17,000	20,000	41,000	1,085,000	-4.23
S.R. ..	1,000	5,000	4,000	8,000	177,000	-0.88

The following table compares the receipts for the 48th week in 1938 with those for the corresponding week in 1936:—

	48th Week				Year to date	
	Pass., &c.	Goods, &c.	Coal, &c.	Total	Inc. or Dec.	%
L.M.S.R. ..	5,000	77,000	13,000	95,000	153,000	-0.26
L.N.E.R. ..	10,000	49,000	9,000	68,000	4,000	-0.009
G.W.R. ..	1,000	19,000	10,000	28,000	266,000	+1.09
S.R. ..	5,000	4,500	4,500	14,000	658,000	+3.40

Passenger train receipts for the 48 weeks of 1938 show an advance of £2,645,000 over those for the corresponding period of 1936, and coal class takings are still £875,000 up, but merchandise is down £2,753,000.

### Jamaica Government Railway

Satisfactory results were secured by the Jamaica Government Railway in the year ended March 31, 1938. Revenue was the highest since 1931-32, and the working profit the best since 1932-33. Exceptionally heavy banana traffic was the principal cause of the improvement, but general merchandise also contributed, in consequence of further reductions in rates. Accelerated services and cheaper return fares accounted for the increase in passenger numbers and the decrease in passenger receipts.

	1936-37	1937-38
Passengers .. .. .	382,134	405,025
Goods, tons .. .. .	303,468	370,258
Train-miles .. .. .	410,852	455,462
Operating ratio, per cent. .. .	98.37	81.36
Passenger receipts .. .. .	£ 27,100	£ 26,166
Goods receipts .. .. .	216,083	274,241
Gross receipts .. .. .	279,384	338,500
Expenditure, including renewals ..	274,839	275,420
Working profit .. .. .	4,545	63,080

Expenditure in the year under review included £9,692, for renewals, &c., and for flood damage. Total debt charges were £89,341, leaving £26,261 to be met from general revenue. The length of line remained at 210 miles, on the standard gauge.

### Standard Time

Standard Time is now such a commonplace that we are apt to forget that the adoption of this indispensable convention is relatively modern, and that it is not so very long ago since the time in a locality was that of the local sundial. We are reminded of this by the commemoration recently in Toronto of the sixtieth anniversary of the invention of the principle of Standard Time, as we now know it. Sir Sandford Fleming, its distinguished sponsor, was born in Scotland in 1827. He emigrated as a youth to Canada, where later he practised as an engineer in partnership with the late Sir Collingwood Schreiber, afterwards Chief Engineer for the Canadian Pacific Railway. It was in connection with his railway work that Fleming first had occasion to study the question, when the development of telegraphs and telephones in connection with railway operation made constant and co-ordinated timing indispensable, and in 1878 he proposed to the Canadian Royal Institute the solution of 24 one-hour time belts of 15 degrees each, around the globe. This scheme, known as Standard Time, was put in force by the railways of Canada and the United States in 1883, although it was not universally adopted by the rest of the world until after the Washington Conference of 1884. The evolution of Standard Time was fully described in THE RAILWAY GAZETTE of December 28, 1934, and also in *The Railway Magazine*, of September, 1935.

### Chronological Order

We had occasion recently to remark in these columns on the conflicting opinions that exist with regard to railway practice, and we find that the diversity of views extends even to minor questions such as the method of presenting statistical figures. In the summaries we publish of the yearly reports of railways all over the world, we have been in the habit for many years of showing in the first column the figures relating to the year under review, and in second place, those of the previous period with which the comparison is made. In observing this order we have not been alone, as the American and some other railways show their comparative figures in the same order, the reason being no doubt that the current figures of the report are those which should occupy the most prominent position, the comparative figures being of secondary importance. It has, however, been indicated to us that it

is considered more correct for the figures to be shown in chronological sequence, and we propose to draft our reports with the comparisons in chronological order, thus according with our other statistical tables.

\* \* \* \*

### The Seed of Industry

A chance experiment has brought a new and profitable industry to Cornwall and extended its cut flower season from three to six months. Travelling in France in 1924, Canon Boscawen was so impressed with the beauty of the giant anemone, which grew there in abundance even during the winter months, that he brought back seeds of the variety *Du Caen* and planted them in his garden in the West Country. They flowered just as profusely in the warm soil and mild Cornish climate as on the Continent. Local growers noted this fact, and as an experiment a few bunches were sent to Covent Garden. They proved popular and the demand increased to an extraordinary extent. Today anemone farms cluster around Penzance and in the sheltered spots along the Devon and Cornish coast. In Cornwall alone there are over 1,000 growers. The area under cultivation has increased from 50 to 400 acres in the last seven years, and something like 60,000,000 corms are now planted annually. This year the anemone traffic promises to beat all records. In the early hours of the morning of October 31 last, over six tons, representing 600,000 blooms arrived at Paddington station en route for Covent Garden alone—a 40 per cent. increase over the traffic received on a similar night last year.

\* \* \* \*

### The Mile-a-Minute Standard in Italy

As in France and Germany, the recent Italian acceleration, mentioned in our November 18 issue, now make it possible to travel at least once daily between most of the principal Italian cities at an overall average speed of 60 m.p.h. or more. With an electrically-operated high-speed unit the 390.8 miles between Milan and Rome are covered in 6 hr. southbound and 6 hr. 2 min. northbound, at an average of 65 m.p.h., and the continuation runs of the same train between Rome and Naples (in one direction at 72 m.p.h.) bring the latter city also within the mile-a-minute orbit. Another accelerated service links Turin and Genoa with Rome, the journey of 414.5 miles being accomplished in 6 hr. 55 min., at almost precisely 60 m.p.h., and incidentally giving the Turin business man over 3 hr. in the capital before returning the same day, if he so desires, and getting home by midnight, having travelled 829 miles since 7 a.m. the same morning. Intermediate cities on these routes—Bologna and Florence on the Milan—Rome line and Pisa and Leghorn on the Genoa—Rome line—benefit similarly by these facilities. Then across the north of Italy, linking Turin with Milan and Milan with Venice, there are high-speed diesel services, and as well as between Bologna, Venice and Trieste, and Bologna, Verona, and Bolzano, maintaining the same mile-a-minute standard of speed.

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### A Glazed Terminus

On the initiative of Pilkington Brothers, the glass manufacturers, an unofficial Glass Age Town Planning Committee has been making designs showing how certain parts of London could be re-planned, the buildings to be mainly of glass. Mr. F. R. S. Yorke, A.R.I.B.A., one of the committee, has evolved a design for Liverpool Street and Broad Street stations. He contemplates enlarging the approach area, and moving the station buildings a little to the north. Electrification of the L.N.E.R. would enable tall and separated blocks of offices or flats to be

erected over the lines. The buildings would have frames of reinforced concrete and steel, and two-thirds of the wall area would be glass. The drawing (see p. 1003) illustrating Mr. Yorke's scheme shows gaunt erections with horizontal bands at the floor levels, the rest being glass with thin vertical divisions. Apparently the buildings would be air-conditioned. If the heating systems were made powerful enough to keep the interior warm, an all-glass-fronted block for offices might have its advantages; for residential purposes, the effect would surely be unhomey. But as the Glass Age Committee is planning for the future, it perhaps anticipates a stage of evolution in which man's homely instincts will be subjugated to considerations of alleged terrific efficiency. By that time, man having developed more of the attributes of bees, transport would probably move in the air and not on railway lines; it therefore seems to be a waste of time thus to re-design Liverpool Street station.

\* \* \* \*

### Two Unfortunate Mistakes

Colonel Trench's report on the accident at Newport (Mon.), G.W.R., on August 19, 1938, a summary of which appears on page 1012, shows the initial cause to have been the clearing of a wrong ground signal through an unfortunate slip on the signalman's part. The signal was misread by a fireman, who took it as correctly applying to his train, and misled his driver, who could not see the signal from his side of the engine but could see two other signals farther on, which were cleared for their part of the correct movement. Those concerned on the platform could not see the ground signal from where they stood. The train accordingly travelled along a short spur and the enginemen did not realise it early enough to avoid striking a stop block. Fortunately, the consequences were not serious. Responsibility is placed mainly on the signalman, who, however, was working with due care, and some on the driver who, with his fireman, is regarded as to some extent a victim of unfortunate circumstances. The company is recommended to consider the desirability of providing a running signal for the movement in question. It is of interest to note that Colonel Trench considers that the route-lever system of working, in use for 10 years past at Newport, had no bearing, direct or indirect, on the signalman's mistake.

\* \* \* \*

### Roller Bearings Solve Lubrication Troubles

In a recent article by Herr Karl Günther of the Reichsbahn in *Glaser's Annalen* on "Steam Locomotives for High Speeds," reference was made to oil thrown off when a locomotive is running. It has apparently been the German experience that in streamlined locomotives such oil ricochets from the streamlined casing on to the tyres, rails and brake blocks, and as it is borne along by the air currents under the train, it reduces the friction between the wheels and the rails, both when starting and braking. Owing presumably to the protection of the parts from the cooling influence normally provided by the rush of air in travelling, it is found necessary to supply oil to the brasses on streamlined locomotives during intermediate stops because of the stipulated quantity of oil having proved insufficient. As a remedy for lubrication troubles roller bearing and needle-valve lubricators are recommended. Herr Günther states that up to the present time roller bearings on carrying wheels have not given rise to any trouble, though it remains to be seen whether they can be used with equal success for the inside boxes of coupled wheels which may have to withstand severe lateral shocks.

### Commercial Organisation of French Railways

A lucid survey of an involved subject—the commercial organisation of the French National Railways—was given in a lecture by M. Charles R. Cazenave, District Commercial Superintendent of the company in London, to the Railway Students' Association on Monday last. He divided his lecture under four headings: the salient periods in the history of French railways, the formation of the National Company, passenger and goods rates and conditions, and, finally, road and rail co-ordination. A full report on the first two divisions appears on page 1010. The speaker concluded his comprehensive paper by saying that though the French National Railways Company was feeling the effects of the present commercial depression in France and of unrestricted road competition and also, in spite of increased fares and rates and economies in all branches of railway working, its operating ratio was far from satisfactory, he was convinced that they would be able in the very near future to put the railways on a sound financial basis, thanks to the better deal which they had been given with the formation of the new company.

\* \* \* \*

### A Remarkable Articulated Locomotive

A remarkable locomotive, one of a series of sixteen recently despatched from this country to serve under very difficult conditions in South Africa, is the subject of an article in this issue. The engines are built on the well-known and highly efficient Garratt articulated principle, and their design incorporates a number of unusual features. They have been built for the Johannesburg—Zeerust—Mafeking section of the South African Railways, on which increased traffic and individual train loadings had caused serious congestion. Various methods of increasing the capacity of the line were accordingly considered, and the decision was reached to purchase new Beyer-Garratt locomotives of increased size and power. The locomotives have to face long 1 in 40 grades with numerous curves, some as sharp as 500-ft. radius. Added to this, the locomotives have to operate on 3-ft. 6-in. gauge track laid with 60-lb. rails, and they have, we believe, the highest tractive effort ever placed on that weight of rail in any part of the world, namely 68,800 lb. at 85 per cent. of the boiler pressure. We are informed that loads as high as 750 tons, as against 450 and 500 tons hauled by the two classes of Garratt engines previously employed, have already been satisfactorily handled by the new 4-8-2 + 2-8-4 locomotives without assistance, and the introduction of the new type should provide an increase in the capacity of the line in the region of 50 per cent.

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### Maintaining a British Reputation

Only those who have tried it know what it means to design locomotives such as the new S.A.R. Garratts described in the preceding note. The ability to produce an articulated locomotive capable of exerting nearly 69,000 lb. tractive effort on a gauge of 3 ft. 6 in. laid with 60-lb. rails, and to conform to strict requirements governing weight distribution, is the result of the many years in which Beyer-Peacock & Co. Ltd. has specialised in the Beyer-Garratt form of construction. The accumulated knowledge and experience of the type under widely varied and oftentimes the most difficult operating conditions which the firm has now acquired, is certainly an asset when the British locomotive industry is regarded from the standpoint of international competition. Both the Chief Mechanical Engineer of the South African Railways, Mr. W. A. J. Day, and the builder are to be congratulated on the new locomotives.



## Railways' Square Deal Campaign

**A** SOMEWHAT surprising development in the railway companies' campaign for the removal of the crippling statutory control of their charging powers, is the fact that their representations have received the qualified support of the British Road Federation, which represents 58 national transport organisations. In a statement issued on November 29 the federation expresses approval of the proposal that restrictive transport regulations should be removed, as this, it claims, is the cardinal principle of its own policy. The statement then proceeds to the argument that, while railways may have ground to complain of the restrictions under which they operate, the road transport interests have even greater reason to complain of restrictive regulations and excessive taxation which are gravely hindering initiative and development. It will readily be appreciated that the federation's claim is much wider than that made by the railway companies. The railways merely seek relief from the inequality of the conditions under which they are forced to quote rates in competition with other transport organisations. The statutory control of railway rates is now, they contend, an unfair handicap when they seek to compete with road transport operators who are free from all rate control and legislative restrictions as to undue preference. The regulations from which the federation seeks relief are those governing the licensing of their vehicles, involving a limitation of the number of vehicles to be employed, and the nature of the traffic to be carried. These are operating restrictions and, while they affect working costs, they do not affect the freedom of road operators to pick and choose the traffic which is most remunerative, or prevent them from discriminating between one trader and another in the matter of rates.

The railway companies are under a burden of legislative requirements concerning the construction and operation of their lines which is at least as onerous as that applicable to road hauliers, but their representations to the Minister of Transport are confined to a plea for equality with road hauliers in the matter of restrictions on the quotation of rates. As mentioned in these columns last week, the railway companies met representatives of the Ministry of Transport on December 1 and amplified their proposals in certain respects. This interview was followed by a discussion with the Minister on December 8, when the railway companies handed in a memorandum indicating the nature of the legislation which they desire the Minister to present to Parliament, and their reasons therefore. On the previous day the representatives of the railway companies met a large number of Members of Parliament at the House of Commons for the purpose of explaining their case in detail. Apprehension has been expressed in certain quarters at the possibility that the railway companies might use any freedom from rate control which might be granted them for the purpose of improving their financial position by increasing substantially the railway rates on heavy traffics which are more or less tied to the railways. Such fears are quite unfounded, and, indeed, if any such action were contemplated at any time by the companies, it could be easily and effectively met by the organised bodies who control these industries.

The continued serious decline in railway receipts adds point to the urgency of their request for the removal of the statutory rate controls which, although justified in the earlier days of railways, have been rendered completely out of date by the swift growth of the road haulage industry. The whole point of the railway case is that if the companies are to maintain their undertakings in a state of efficiency, they should be as free as their com-

petitors to adjust their charges when they consider such a step desirable, without being involved in the present inordinate delay and expense. Such a claim, it is submitted, is eminently fair and reasonable.

A suggestion was made in *The Star* of Wednesday, December 7, that preliminary investigations have been undertaken by the Transport Advisory Council into proposals for the co-ordination of all transport services in Great Britain—road, rail, air, canal, and coastwise shipping—with a view to their discussion at the meeting of railway chairmen and general managers with the Minister of Transport yesterday. There is no official confirmation of these statements, and in any event such proposals would not be of any assistance to the railway companies in their present stress. The difficulty of obtaining any real co-ordination between railways and road hauliers of goods has been made evident in other countries besides our own, particularly in France, Switzerland, and India. We do not look forward to any such unwieldy organisation, the formation of which could not be completed until the mischiefs of the present situation had done their worst.

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## Madras & Southern Mahratta Railway

**C**HANGES in the mileage operated by this company were made during the year ended March 31, 1938. The Mysore State metre-gauge lines of 262 miles hitherto worked by the company were transferred to the Mysore Government on January 1, 1938, leaving 10 miles of Mysore broad-gauge line still to be worked by the company. The Bezwada—Masulipatam metre-gauge branch of 52 miles, purchased by the Indian Government from the Kistna District Board on February 4, 1938, is now included under "Company and State Lines," which at the end of the financial year consisted of 1,119 miles broad gauge and 1,712 miles metre-gauge. "Worked lines" were 31 miles broad-gauge and 104 miles metre-gauge, of which 51 miles belonged to the West of India Portuguese Railway. Capital outlay during the year 1937-38, excluding expenditure on suspense, was £241,621 only, of which £228,506 represented the purchase price of the Bezwada—Masulipatam Railway. Gross earnings of company and State lines during the year under review amounted to Rs. 688.87 lakhs, a gratifying increase of Rs. 16.32 lakhs, and in the working expenses of Rs. 402.80 lakhs there was a reduction of Rs. 3.69 lakhs, leaving net earnings Rs. 20.01 lakhs higher, at Rs. 286.07 lakhs. Figures for the Mysore Railway were for nine months only, and the net earnings were Rs. 3.90 lakhs less. Other worked lines produced net earnings which were Rs. 1.72 lakhs lower than in the previous year. For the whole system gross earnings were higher by Rs. 1.96 lakhs, working expenses showed the substantial reduction of Rs. 12.43 lakhs, and net earnings were bettered to the extent of Rs. 14.39 lakhs.

The coaching traffic earnings of Rs. 257.12 lakhs showed an increase of Rs. 5.30 lakhs or 2 per cent., and the increase from passenger traffic exactly corresponded to this figure. In first and second class traffic the variations were small, and it is noted that this class of traffic does not pay its way. The provision of inter-class accommodation on additional trains increased the number of passengers by 90,000 and the receipts by Rs. 71,000 in this class of traffic. Third class passengers increased in number by about 2½ million and their receipts by nearly Rs. 5 lakhs. The introduction, from the summer of 1937, of cheap return tickets, including zone, travel-as-you-like, and circular tour tickets, and improvements in the train services have contributed to this advance. In goods traffic the increase in weight carried, with a decrease in

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earnings, was mainly due to the increased carriage of minerals (coal and manganese ore) at low freight rates, and reduced general merchandise traffic at more remunerative rates, chiefly ground-nuts, raw cotton and grain and pulses. Some comparative figures for the whole system are given in the accompanying table:—

	1937-38	1936-37
Mean mileage worked ..	3,170	3,235
Train-miles .. ..	—	14,120,301
Passengers .. ..	33,007,437	30,640,834
Paying goods, tons ..	4,950,733	4,818,380
Operating ratio, per cent. ..	58.4	60.2
	Rs. lakhs	Rs. lakhs
Passenger receipts .. ..	214.67	209.37
Goods receipts .. ..	441.41	453.38
Gross earnings .. ..	749.33	747.37
Working expenses .. ..	437.43	449.86
Net earnings .. ..	311.90	297.51

Under working expenses there was an increase of nearly Rs. 4 lakhs in repairs and maintenance costs. The increase of Rs. 11.85 lakhs in operating costs was chiefly the result of increased freight charges on locomotive fuel, and increased issues of fuel due to more train-miles run. The revenue share of the charges for replacement and renewal of track, machinery, and works was Rs. 31 lakhs less than in the preceding year. In 1937-38, only 14 miles of track were relaid with an improved standard of rail against 74 miles rerailed in 1936-37. Two "XB" locomotives, 32 boilers, and 6 railcars were charged off in 1936-37, against no locomotives, 16 boilers, and no railcars in 1937-38. The results of working for the first 9 months of the year, April to December, 1937, were required to be worked out under the old contract of 1908 and for the last 3 months, January to March, 1938, under the new contract dated March 24, 1937, which will run for certain until December 31, 1945. The company's share of surplus profits from State and company's railways for the year 1937-38, less Indian income tax and supertax, amounted to Rs. 14,25,058, against Rs. 18,81,294 in 1936-37. Adding surplus profits (less Indian income tax) of Rs. 39,257 from the Mysore State Railway, as compared with Rs. 53,149 for the previous year, gives a total which realised £110,017, comparing with £146,242 for 1936-37. The total distribution to stockholders (made up of  $3\frac{1}{2}$  per cent. guaranteed interest,  $3\frac{3}{4}$  per cent. from stockholders' revenue account, and  $\frac{1}{2}$  per cent. from reserve) will be  $7\frac{1}{2}$  per cent., as against  $8\frac{1}{2}$  per cent.

### Bengal-Nagpur Railway

RESULTS obtained by this company during the year ended March 31, 1938, were noteworthy as surplus profits exceeding interest charges were earned for the first time since the year 1927-28. The Bengal-Nagpur system includes two principal main lines on the 5 ft. 6 in. gauge, one running west from Howrah (Calcutta) to Nagpur, where a junction is made with the Great Indian Peninsula Railway to Bombay, and the other southwards from Khargpur (72 miles west of Howrah) by the east coast to Waltair, where connection is made with the Madras & Southern Mahratta system, and to Vizagapatam. Rairpur on the Nagpur line is connected with Vizianagram on the east coast line by a broad gauge chord. Between Howrah and Khargpur the line is double-tracked. Gross earnings for the year under review increased by Rs. 1,07,08,430 or 12.8 per cent. in comparison with 1936-37, and working expenses by only Rs. 19,45,515 or 3.34 per cent., so that net earnings improved by Rs. 87,62,915 or 34.7 per cent. The company's share of the surplus profits of Rs. 67,03,577 for the year under review amounted to Rs. 3,18,648 after payment of Indian income tax, and realised £23,566. Ordinary stockholders receive 4 per

cent. for the year under review, the same as for the six previous years, of which  $3\frac{1}{2}$  per cent. comes from guaranteed interest. After providing for the dividend payment and for other authorised expenditure, the balance of the reserve will be approximately £26,000. Some operating figures are shown herewith:—

	1937-38	1936-37
Mean mileage worked ..	3,268	3,268
Ton-miles .. ..	3,212,438,338	2,745,655,455
Passengers .. ..	19,983,484	18,565,453
Goods, tons .. ..	18,144,070	15,812,176
Operating ratio, per cent. ..	63.87	69.74
	Rs.	Rs.
Passenger receipts .. ..	1,65,23,909	1,51,62,617
Goods earnings .. ..	7,25,93,942	6,33,53,736
Gross earnings .. ..	9,40,80,497	8,33,72,067
Expenses .. ..	6,00,86,605	5,81,41,090
Net earnings .. ..	3,39,93,892	2,52,30,977

Passenger numbers increased by 1,418,031 or 7.6 per cent., and passenger receipts by Rs. 13,61,292 or 8.9 per cent. Receipts from the three upper classes (first, second, and intermediate) amounted to Rs. 26,85,784, against Rs. 25,88,993, and the third class receipts of Rs. 1,38,38,125 showed an increase of Rs. 12,64,501. Third class passengers were 91.5 per cent. of the total carried, and third class receipts represented 83.7 per cent. of the total passenger earnings. Tonnage of goods increased by 2,331,994 tons or 14.7 per cent., and earnings from goods traffic by Rs. 92,40,206 or 14.6 per cent. The advance in working expenses was largely due to increased expenditure under the track and bridge strengthening programme, boiler and wagon replacements, together with heavier running and workshop repairs, both ordinary and special, as a result of the increased train-mileage during the year, and partly to the introduction of the pooling system for locomotives necessitating the intensive usage of engines.

### Boiler Tube Repair Methods

STATING that a shop laid out with modern equipment for the cleaning and maintenance of locomotive boiler tubes can effectively handle between 8,000 and 12,000 tubes a month with a minimum of labour, our American contemporary, the *Railway Mechanical Engineer*, recently remarked that most boiler tube shops are laid out to obtain progressive movement forward of the tubes from the time that they are removed from the boiler to the time that they are again ready for installation. Not all shops, however, effect such movement to the best advantage, and undoubtedly the installation of modern equipment entails in some instances a new shop layout and probably slightly enlarged floor area. Included in the equipment there must be tables or racks on which several sets of tubes and flues can be loaded, and rolled through the length of the shop from one machine to another, and the use of high-speed friction saws for cutting off the tubes is essential; these should be located near the tables or racks. Power-driven rolls for pulling tubes and flues through scale-removing machines at rates of 14 ft. per min. for a  $5\frac{1}{2}$ -in. superheater flue tube, and 22 ft. per min. for a 2-in. ordinary tube are required, and after this operation the tubes can be replaced in the tables and moved to the electric resistance welder, where safe ends are applied. A recent innovation in connection with the welding operation is an air blast which blows slag from the tube interior during the flash period, thus preventing the formation of a ridge on the inside, which in the case of flue tubes provides an obstacle to the insertion of superheater units. Most tube repair shops in this country are equipped in the manner described, and considerable economies in time and money have been effected by the use of modern appliances.

## LETTERS TO THE EDITOR

(The Editor is not responsible for the opinions of correspondents)

### The Aylesbury Branch Mystery

60A, Green Lane,  
Northwood

November 25

TO THE EDITOR OF THE RAILWAY GAZETTE

SIR,—Tuck's "Railway Shareholders' Manual" for 1845 states that the Aylesbury Railway terminated in a junction with the London & Birmingham at Cheddington, 36½ miles from London. Drake's Guide of 1839 makes it 36 miles, but it seems like the site of the present station. *The Railway Magazine* of July, 1839, in its advertisement pages, gives the London & Birmingham timetables, which have a note: "Down trains: The 8 a.m., 2 p.m. and 5 p.m. trains call at the Aylesbury Junction," with a similar note for the up service. Cornish reproduced at the same time the first official timetable of the "Aylesbury Railway in conjunction with the London & Birmingham Railway," which states that on and after Thursday, June 20, 1839, the 8 a.m., 2 p.m. and 5 p.m. from London are due at Cheddington at 9.45 a.m., 3.45 p.m. and 6.45 p.m. respectively," with similar information as to up trains with departure times from Aylesbury. It also shows that passengers from Aylesbury to Birmingham joined the train at Cheddington.

From this information it is clear that from the opening of the Aylesbury line in June, 1839, a shuttle service was operated between Aylesbury and a station on the main line which the Aylesbury Company called Cheddington, and the London & Birmingham called "the Aylesbury junction." Until the local line was leased to the London & Birmingham in 1844, Cheddington does not, I believe, appear in *Bradshaw*.

Yours faithfully,

REGINALD B. FELLOWS

### A French Locomotive Veteran

1, Cumberland Terrace,  
Regent's Park, N.W.1

November 28

TO THE EDITOR OF THE RAILWAY GAZETTE

SIR,—The enclosed photograph [reproduced on p. 1006, Ed. R.G.] of an old 2-4-0 passenger locomotive snapped on the electrified main line of the P.O.-Midi (whose chaired road will be noticed), just outside of the station at Bayonne in September of this year, may interest some of your readers, as it shows what must be one of the oldest locomotives still in service in France. A plate on the splashers of the driving wheels indicates that the engine was built by the famous old French firm of Gouin & Cie, so well known during the Second Empire and long since taken over by the Batignolles Company, probably about 1855. There is another plate on the splashers of the coupled wheels with the words "Modifications. Bordeaux. 1863," so that even in its rebuilt form this old engine is a very hardy veteran.

The peculiar arrangement of the valve gear will be noticed. The link block engages an arm pivoted to the bottom of the guide yoke, the valve rod engaging this arm above the link block, thus giving a longer valve travel than the movement of the link block itself. The balloon stack reminiscent of early woodburning American locomotives; the cast iron safety-valve column in the form of a small cannon; the position of the air brake reservoir as a second dome; the grille extending over the footplate at the rear of the cab roof to prevent the fouling of the catenary wires (which can be seen through the smoke) by the fire irons; and the outside steam pipes with their special steam head, all give this old locomotive a highly individual character, and bring back a period of French locomotive history long since passed. One can only hope that such an interesting example of it will be preserved.

There are two or three of these old machines based on Bayonne and in service on the branch lines running through

the Landes forests. Perhaps one of your readers can determine the exact date of their construction and the railway for which they were originally built, the P.O. or the Midi.

Yours faithfully,

RICHARD E. PENNOYER

### Locomotive Driver or Engineer?

"Belfoyne," Cliff Road,

Dovercourt, November 21

TO THE EDITOR OF THE RAILWAY GAZETTE

SIR,—Professor Pigou in the preface to his "Theory of Unemployment" compares economists with "engineers, not engine-drivers." After this distinction has been drawn by so keenly analytic a mind, it seems impossible to avoid the conclusion that since engine-drivers clearly are engine drivers, they cannot be engineers.

To disagree would be to remove the corner-stone of economic science.

Yours faithfully,

L. P. LEWIS

London, W.C., November 26

TO THE EDITOR OF THE RAILWAY GAZETTE

SIR,—A point which seems to have been missed in the correspondence concerning the use of the term locomotive engineer is that the precise sense of the word engineer has varied from time to time, with the tendency constantly in the direction of specialisation. Primarily the word came into use in the English language to mean anyone engaged upon an engineering work. Thus, about 1325 reference is made to "A tour ful strong, That queyntly engynours made." Writers of the 16th and 17th century accepted and used the word for this meaning, and, as engineering became exclusively a military pursuit, gradually implied a military engineer; Dr. Samuel Johnson in 1755 knew only the military engineer. In the latter part of the 18th century the industrial revolution introduced engineering to industry and resulted in the development of the distinctive designation of civil engineer. The military meaning of engineer as "a soldier belonging to the division of the army called Engineers, composed of men trained to engineering work" is shown by General Porter in his History of the Royal Engineers when he says "This day [May 26, 1716] may therefore be taken as that on which the engineer branch of the British army blossomed into a distinct corps." *The London Gazette* of April 24-28, 1787, announced that "The Corps of Engineers shall in future take the name of Corps of Royal Engineers."

In civil, or industrial, activities both mining and marine engineering preceded locomotive engineering, and in both businesses the term engineer was applied to "one who manages an engine or engines," or, as some dictionaries gave it, "one who has charge of a steam engine." Incidentally, both colliery and marine practice still allow this use. As railways began as adjuncts to the mining industry, the word engineer was naturally applied to the locomotive driver equally with the stationary-engine keeper, and, when differentiation was required, the former was obviously the locomotive engineer. Exactly one hundred years ago on the G.W.R. "the chain connecting the train with one of the engines . . . having accidentally given way, the train suddenly became stationary, the engine proceeding as before." In recording the incident, the *Sunday Times* of November 18, 1838, had no hesitation in remarking that "the engineer did not discover his loss until he had proceeded about four miles." The head of the department in those early years was the "locomotive superintendent," so no confusion arose.

What today we call civil, as opposed to mechanical, engineering had already begun its struggle for the status of the profession. A society of civil engineers had been

established in March, 1771, and included such famous men as Smeaton, Jessop, Priestley, Boulton, Rennie, and Watt. Many other members, however, were described as "either amateurs, or ingenious workmen and artificers, connected with, and employed in, works of engineering." About 1791 the membership totalled some 65, of which only about 15 were "real engineers employed in public works, or private undertakings of great magnitude" (according to an account written in 1814). The principal members secured the dissolution of the society in May, 1792, so as to clear the way for the formation in 1793 of "The Society of Civil-Engineers," consisting exclusively of those having specified professional qualifications.

With regard to the locomotive driver, the term engineer has persisted in the U.S.A. to the present time, despite the fact that as long ago as 1860 its suitability was challenged in that country. Bartlett in his Dictionary of American Engineering, published in that year, said "the engine driver on our railroads is thus magniloquently designated." Nevertheless, the U.S.A. trade union became the American Brotherhood of Locomotive Engineers, and its British counterpart, the Associated Society of Locomotive Engineers and Firemen. The latter began its *Monthly Journal* in February, 1888, and in its first number referred indiscriminately to the 30,000 "engine drivers and firemen" in the country; to "locomotive enginemen and firemen"; and to the "strain on the engineer in foggy weather." It asked how many of the passengers "think of the engineer when they get into the train," said that even in severe weather "the engineer must not shirk his duty," and continued with a reference to stories of "engine drivers who have displayed great heroism and courage in the face of very great danger."

My great-grandmother, who was born about the time of the battle of Waterloo and therefore well remembered the birth of steam-operated passenger railways, always called the driver "the engineer," and pandered to my childish enthusiasm for railways by singing me a song that began:—

"Daddy's on the engine,  
don't you be afraid"

The verse concluded:—

"Everybody's safe because  
my daddy's the engineer"

If, sir, you publish this lengthy note on the word engineer in history, I hope you will allow me to add that I regret as greatly as any of your correspondents the continued use of the term engineer for an engine driver. The A.S.L.E.F. adopted its title at a period when it was still justified by use, and doubtless would regret on historical and sentimental grounds to make a change now. Nevertheless the slight change of "engineers" into "enginemen" would leave the familiar initials intact, and would be a graceful act on the part of a valued section of the railway community.

Yours faithfully,

PRAXITELES

### L.N.E.R. Streamlined Performance

198, St. Helen's Road,  
Hastings

November 20

TO THE EDITOR OF THE RAILWAY GAZETTE

SIR.—The following authentic notes are the outcome of several enthusiasts' continuous L.N.E.R. observations, mainly in the neighbourhood of Newcastle and near King's Cross, which continue as a labour of love as well as an interesting hobby.

The up Coronation express, which makes a six-hour run over the 392.7 miles from Edinburgh to King's Cross with a Newcastle stop, has displayed a remarkable average of punctuality recently. In three months between June and September the train with one exception was never in Newcastle later than 6.28½, though not due until 6.30. Often the arrival was between 6.25 and 6.27; sometimes as early as 6.24. The schedule of 120 min. for 124.4 miles is, of course, much easier than that applying further south and the Scottish drivers who are in charge of the engine over this stage get into Newcastle early in order to give the men

taking over (for a 268.3-mile non-stop run at an average of 68 m.p.h.) a little longer than the booked three minutes for getting coal forward, oiling, examination, and so on. On the one occasion when a late arrival did occur at Newcastle, resulting in an eight-minute late restart, the whole of this delay had been recovered by the time the train flashed through Potters Bar, King's Cross being reached punctually after maintaining an overall average of 70.4 from the Tyne. The engine was No. 4493, *Woodcock*; Driver Auger, King's Cross, and the usual full load of 312 tons tare or about 325 tons gross. Of 43 trips in August and September which were carefully timed on passing the London suburban area, 41 were punctual or up to 4 min. early; one 2 min. late and the other 15 min. on account of another train's troubles, presumably.

The down Coronation also achieved some remarkable running last summer, but the period includes part of June when strong adverse winds as well as relaying slacks prevailed. The schedule, the fastest steam one in Europe, with a 71.9-m.p.h. booking over 188.2 miles to York stop, followed by a sharp timing over the 80.3 miles to the second halt at Newcastle, is a difficult one. Of 76 runs observed, 42 reached Newcastle up to 3 min. early, 17 were punctual; 16 showed an average of about 4½ min. late; and one was more seriously delayed on account of the engine "running hot" and having to be detached. Doubtless a number of the trips which were a little behind time on crossing the Tyne arrived in Edinburgh punctually. With the advent of the winter service the load was reduced to one of 278 tons tare, or 290-295 gross; it was also similar for a short time in August. News is just to hand of an equally good autumn performance—a 6½-min. recovery from Newcastle south-bound without the observation car by No. 4498 *Sir Nigel Gresley* in charge of Driver Nash, King's Cross. The same engine frequently makes the through London—Edinburgh runs on this service for a week, up and down alternate days, as do the enginemen over the Newcastle—London stage, King's Cross and Gateshead crews alternating.

Similarly good records of consistent timekeeping on the part of the Silver Jubilee and West Riding Limited, as far as observed, are revealed. For two weeks in September that paragon "stayer" No. 4492, *Dominion of New Zealand*, ran every trip, up and down, of the West Riding Limited successfully. The duty included an outward run from London to Leeds on the Sunday and one in the opposite direction on Saturdays with ordinary trains to balance the working. This express was worked from Leeds to London twice by one of the original "A1" Pacifics, *Centenary*, and on the second occasion she achieved the remarkable feat of gaining 1½ min. on a 68-m.p.h. overall timing. Another time an "A3" 220-lb. 4-6-2 was on and although stopped south of Essendine, where speed normally rules high, arrived in King's Cross only 4 min. late. This was *Papyrus*, which sustained a then record speed of 108 m.p.h. when on a test run in 1934. The load in each case was 278 tons tare, or 295 full.

Though not a streamlined train (the engines are, however) a few details of the recorded daily notes of Flying Scotsman passing times while the train was making its seven days a week non-stop runs during last summer may be of interest. Observed near Newcastle on 61 occasions, the northbound train passed slightly early 30 times; 19 occasions were punctual; 14 slightly late, up to 5 min.; and 6 other dates behind time to the extent of a mean of 6½ min. The busiest Saturdays and Sundays of the high season are here included while the train has been traversing a heavily trafficked area for many miles on the hardest part of its schedule. Opportunity would occur for time recovery after the Tyne-side district had been cleared. Though details are not so complete at the London end, a similar picture would appear to have been presented by the up service, loading representing about 440-480 tons gross. No engine trouble of any kind was evident throughout the season. No. 4491 *Commonwealth of Australia* (Haymarket shed, Edinburgh) made 36 runs, and No. 4489 *Dominion of Canada* (King's Cross shed) 33 trips on this year's famous "non-stop."

Yours faithfully,

R. A. H. WEIGHT



## PUBLICATIONS RECEIVED

**Comparative Statement of Railway Operating Statistics.** Steam Railways in the United States having annual operating revenues over \$5,000,000, Years 1937 and 1936. Washington, D.C.: Superintendent of Documents. Interstate Commerce Commission. 17½ in. × 11 in. 79 pp. Paper covers. Price 50 cents net.—An explanatory foreword says that this issue of the Comparative Statement supersedes the publication formerly called "Comparative Statement of Operating Averages," and also some part of the publication entitled "Operating Revenues and Expenses by Class of Service." It also includes a considerable number of additional data not hitherto published. In the present arrangement the railways are grouped by regions, "New England Region," "Great Lakes Region," &c., and in all 82 railways are scheduled, in eight regional groups. In cases where lines operate in more than one region, this is indicated in footnotes, and in some instances, where two or more roads are essentially one operating unit, the figures are combined. There are no regional totals, and indeed there are no aggregate figures for any particular group of statistics, the data relating only to individual railways, and, as the sub-title indicates, limited to those having annual operating revenues over five million dollars. The foreword promises comparable items for districts and regions to be published at a later date, and it is to be hoped that this later publication will give the aggregate figures for the whole of the railways, as well as averages based on the aggregates. It is to be regretted that these statistics cannot be available at an earlier date, but this may be accounted for by the mass of detail which it is necessary to classify and tabulate, and which fills this voluminous record. For reference to individual railways, the book must be invaluable, containing, as it does, all the essential statistics, ranging from investment capital and operating revenue and expenditure, to mileage running figures, fuel consumption and average rates of pay.

**Route Relay Interlocking and Resignalling at Paragon Station, Hull, L.N.E.R.** 16 pages, 8½ in. × 11 in. 21 half-tone illustrations, colour plate and plan. The Westinghouse Brake & Signal Co. Ltd. has issued a reprint of the articles published in THE RAILWAY GAZETTE of July 1 and July 15 last, describing the route relay interlocking and resignalling at Paragon station, Hull, L.N.E.R. As long as 30 years ago the former North Eastern Railway was an extensive user of electro-pneumatic signalling. In common, however, with the layouts on its system at Newcastle, Tyne Dock and elsewhere, the installation at Hull, Paragon, used power solely for the operation of points and signals, at first without track circuits, although a few were added in the course of time.

The signalling at Paragon station and its approaches has now been completely modernised; two signal boxes, Park Street and Paragon, containing between them 322 miniature levers, having been replaced by a route relay interlocking operated from a control panel of novel design. It is the largest installation of its type hitherto constructed. Unlike the signalling at Leeds New station (described in THE RAILWAY GAZETTE for April 23, 1937), where individual point and signal operation is used, the route-setting principle has been adopted at Hull, the signalman having to manipulate one handle only—a thumb switch in this case—to set up a complete route and clear the relative signal if conditions are such as to permit this to occur. The practice followed in earlier relay interlocking work in this country of arranging the controlling switches on the track diagram, has not been followed in this instance owing to the large number of routes associated with the majority of the signals. Instead, the switches have been grouped together on a separate control panel below the diagram. There is thus some resemblance to the practice familiar in the older powersignal installations, but a power frame of conventional design to do the same work would have been more than five times the length of the present apparatus, which is remarkably compact. The complete interlocking of all signals and points for the 230 possible routes involved some 60 miles of cable in the signal box alone. The illustrations in this reprint have been carefully chosen to show every leading feature of the work. Printing and paper are alike excellent, and all who are interested in modern methods of signalling and handling traffic may with advantage add this booklet to their libraries.

**American Railway Signalling Principles and Practices.** Chapter XXIV: Power Distribution Systems and Lighting Protection. New York: Signal Section, Association of American Railroads, 30, Vesey Street. 9 in. × 6 in. 45 pp. Illustrated. Paper cover. Price 30 cents net (Members and railroad employees, 20 cents).—This publication, forming another chapter in a book, or set of books, covering the whole field of signalling, under preparation for some time by the Association of American Railroads, deals with the various systems of electric power distribution most frequently met with in American signal installations. Brief descriptions are given of open-line construction work, underground conductor systems, and the various arrangements of transformer locations, with explanations of such devices as sectionalising switches, cut-outs and capacitors, accompanied by diagrams and photographs. Then there is a section on lightning protection, giving details of various designs of arresters, their principles of working, and methods of attachment to circuits

and apparatus. The explanations are clearly and concisely given and are followed by the customary series of questions (in this case totalling 237) to test the reader's knowledge.

**Model Railways.**—Items of interest in "Model Railways," a new illustrated catalogue, produced by Bassett-Lowke Limited, for gauge "0" enthusiasts, are the appearance of three additional model locomotives—*Duchess of Montrose* and *Victory* (L.M.S.R.), and *Melton Hall* (L.N.E.R.); price reductions in steel permanent way and certain examples of passenger rolling stock; and a new type of signal box. Among signalling accessories, attention is drawn to a standard range of inexpensive upper-quadrant signals. The catalogue may be obtained, price 3d. including postage, from 112, High Holborn, W.C.1.

**The Hornby Book of Trains.**—A catalogue in colour of model railway sets and accessories, accompanied by "real railway" articles copiously illustrated, is a combination that almost makes a juvenile Christmas present in itself. The donor will be lucky, however, if he gets away with the outlay of threepence, which is all that Meccano Limited, of Binns Road, Liverpool, charges for the publication. The numerous railway models listed are presented in an attractive manner that will stimulate the acquisitive instinct, but have the advantage of being reasonably priced. An innovation in the Hornby range this year is the Hornby-Double outfit, which not only presents accurate "00" gauge model trains at an unusually low price, but adds the novelty of providing for the independent control of two trains running on the railway at the same time.

**Dust Removal.**—Keith Blackman Limited, of 27, Farringdon Avenue, E.C.4, sends us a catalogue (No. K 189) of dust-exhausting plants. It is pointed out that these plants are in everyday use dealing with an almost endless variety of machines and processes—polishing spindles and emery grinders, saws, multi-cutter planers, and other woodworking machines, grain conveyors, textile machines, colliery screens, and so on—and the fund of information thus acquired by the firm is available for the benefit of its clients.

**Drying Plant.**—We have received from Pratchitt Brothers Limited, Denton Iron Works, Carlisle, an illustrated catalogue of rotary dryers and other drying plant for industrial purposes. Heating of the products under treatment can be by direct contact with the flue gases, indirectly by passing the gases round the dryer shell, or by a combination of the two methods. Normal consumption is 1 lb. of fuel for every 4-8 lb. of water evaporated. All types of dryer are built, in sizes ranging from 2 ft. dia. × 15 ft. long to 7 ft. dia. × 40 ft. long or more. A table is appended to the catalogue showing the power required to drive dryers of various dimensions.

## THE SCRAP HEAP

Three live lobsters, one of them 4 in. long, were found crawling in the tender water tank of a Canadian National Railways locomotive, when the tank was emptied at the Moncton shops, New Brunswick.

As an exile from England what most delighted me on this first visit [to Prague] was its amazingly English atmosphere. The Masaryk station—shabby, a little grimy, but so much more friendly than the cathedral-like German stations—might have been Liverpool Street. The wiry porters shouting, not the peremptory "Achtung!" but the Czech for "Please! Please!" when they wanted people to move out of the way of their trucks, were the brothers of those who reiterate so patiently "Mind your backs please!"—From "I Married a German," by Madeleine Kent.

### A TICKET CURIOSITY

We learn from Mr. G. A. Sekon that in 1912 he had occasion to travel on the Metropolitan Railway from King's Cross to Aldersgate Street. Upon glancing at the ticket he found it read "via Moorgate Street," which would involve a journey almost round the Inner Circle. He immediately returned to the booking office and bought a dozen of these "error" tickets as curiosities. A note in the *Daily Mail* the next day called attention to the mistake, and the King's Cross to Aldersgate Street "via Moorgate Street" tickets were at once withdrawn from issue. He adds that they form the only case known to him of error railway tickets of this kind.

A correspondent in *The Sunday Times* recently quoted the story of the stationmaster at Bokhara, to the gates of which a railway was constructed specially for a visit by the Tsar Alex-

ander III. The visit never came off, and the local tribesmen pulled up the rails, but the station, being extra-territorial, was allowed to remain. So did the stationmaster, who continued for 26 years to draw his salary. With the Russian revolution the salary was stopped, and the stationmaster is reported to be making his living by the illicit practice of distilling vodka. A posse of police waits outside his extra-territorial sanctuary for the moment he incautiously sets foot beyond its walls, and are said to ward off the dangers of exposure to the desert air incidental to their vigil with an occasional glass of vodka brewed by their prospective prisoner.

### GOVERNMENT-COINED WORDS

"We print today for the first time the word *decrowded*. There are families which have been *decrowded* in Scotland. That is why we print the word, which has been coined by one of the Departments under the Secretary of State for Scotland." Thus did *The Times* inform its reader the other day of the birth of a word. Our contemporary then proceeded to explain that it is important its origin should be understood, because newspapers are often blamed for the deterioration of the English language. "The deterioration, however, in such instances, never originates from the Press, which knows better, but receives words like *decrowded*—and *evacuee*, dear to the Ministry of Health—ready-made by bureaucratic stylists for its use. . . . And so it goes on, and the language gets steadily drearier and duller. . . . Official announcements can at best be trimmed or abbreviated only here and there; time and blue pencils fail the ordinary newspaper to effect the purge which they often deserve. . . . The official, State or municipal, is the real enemy of sound English; and yet there

are as good clerks in the Civil Service today as were ever devoted to literature."

### AN ISLAND PARADISE WITHOUT A MOTORCAR

Bermuda is one of the few places on the face of the globe where man has asserted a proper control over the internal-combustion engine. There are no motorcars in Bermuda. Everyone cycles, or rides in little open victorias under fringed sunshades. It is true that there is a motor railway (with vans for the accommodation of bicycles) running to the more remote parts, or rather, one should say, remote islands, as most of the larger islands of the group are connected by bridges with one another. But the railway itself is in keeping with the fields of Easter lilies and freesias and the cedar forests through which it runs. Its stations in Hamilton are little gardens, and one steps from the train on to a lawn bordered with white kerbstones and gay with flower beds.—I. L. Priddy, in "The Times" Winter Sunshine Travel Number.

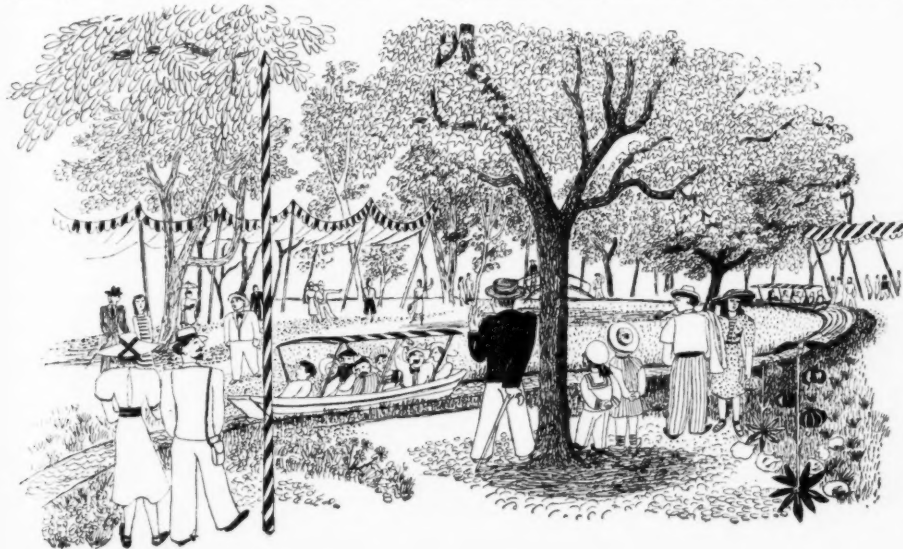
## Ma Perkins Says Tsk!Tsk! to R.R.s

Labor secretary thinks carriers are backward, but she waves forefinger at labor too

Secretary of Labor Perkins made a speech on October 15 at Columbus, Ohio, at a celebration of the seventieth anniversary of the Order of Railway Conductors, in which she gave the railroads a real good dressing down for their "backwardness" in the "development of transportation in its larger aspect." She also made a guarded admonitory statement to the railway unions, when she said that a solution of railway difficulties would provide more jobs.—From the "Railway Age" of October 22 last.

### NOVEL MEANS OF COMMUNICATION, SWISS NATIONAL EXHIBITION, ZURICH, 1939

As described on page 604 in our issue of October 7, a canal 4 ft. wide and 2 ft. 7 in. deep, about a mile in length, will wind through the park in which the exhibition will be held. As there is a fall of 1 in 1,000 throughout, boats full of sight-seers will glide along on the current. At the end of the canal, the boats will be returned to the starting point on an endless belt



## OVERSEAS RAILWAY AFFAIRS

(From our special correspondents)

### RHODESIA

#### Contributory Pension Fund

The non-contributory pension fund for employees of the Rhodesia Railways was closed to new entrants to the service in 1931 and the new contributory fund has now been brought into operation as from October 1, 1938, in so far as contributions by members are effected. The fund, however, will be deemed to have begun from August 1, 1931, and arrear payments for members, estimated at £70,000, will be borne by the railway company. Members will contribute at the rate of 5 per cent. of their pensionable emoluments and the administration will contribute on the basis of 8½ per cent. The normal retiring age under the non-contributory scheme was 55 years, but under the new fund the age for retirement will be 60 years, except in the case of female members, and drivers and firemen who will retire at 55 years.

Pensions will be calculated at the rate of one-sixtieth for each year of pensionable service, based on the average emoluments of the last seven years' service, or the annual average for the whole period of pensionable service whichever sum shall be the greater. Gratuities will be paid in certain circumstances to members retiring through ill-health or to their dependents in the case of members dying before attaining pensionable age.

At a meeting held recently at the railway headquarters, Bulawayo, between representatives of the administration and of the Railway Workers' Union, the contributory pension fund was fully discussed and accepted by the union subject to the question of a reduced retiring age, based on the non-contributory fund, being gone into as regards its practicability and increased cost to the members after one year's working of the new scheme. In the course of the meeting it was stated that at present 1,350 employees would be affected by the new scheme.

#### Water Difficulties

Due to the exceptionally long dry season following the poor rains last summer, the Rhodesia Railways have been experiencing considerable difficulties with water supplies in Matabeleland. At Bulawayo the main source of supply, a dam across the Khami River, failed completely towards the end of the dry season, and it became necessary to draw upon certain emergency wells. These sources were unable to meet the demand but, in anticipation of this, negotiations had been carried on with both the Government and the Bulawayo Municipality for the purchase of water. Fortunately a new dam on the Umgusa River, some seven miles from the railway line, has recently been constructed by the Government,

and a pipe line, with pumping plant, was installed by the railway to pump water to Bonisa Siding, where temporary storage tanks of 50,000 gal. capacity were erected. A regular water train service began running in October between the Bonisa tanks and a reservoir beside the line near Bulawayo, and an average of 90,000 gal. a day was conveyed by water train. As much water as possible was taken from the Government dam as the Municipality had also experienced difficulty in supplying its consumers, but with the break of the rains in November the normal sources of water should soon become available again.

### SOUTH AFRICA

#### Benefits to Partly Disabled Railwaymen

An important concession to railwaymen who have been partially disabled in railway accidents but who are able to continue working has been granted by the administration. Under the existing system, men injured in the course of their duties for whom work can be found on the railways, compromise their claims for compensation by accepting continued employment under certain conditions. These conditions provide that they voluntarily waive any claims they may have for permanent disablement and there is no provision for the payment of any compensation to them on their ultimate discharge. In addition, the administration gives consideration to the award of a solatium based on a sliding scale to railwaymen discharged within ten years on account of ill health resulting directly from an accident. No solatium is at present paid in the cases of voluntary resignation, age retirement, or dismissal.

Under the new scheme a disabled railwayman can compromise his claim for compensation by accepting employment under more generous and stable conditions. His rate of pay will not be reduced below the rate paid to him at the time of the accident, or 3s. per day in excess of the value of the work to which he is transferred, whichever is the less. Though the retention of his services will not guarantee any continuity of employment, he will be able to have a monthly pension if he leaves the service at any time for any reason except dismissal for serious misconduct. The monthly pension will be calculated in accordance with the Workmen's Compensation Act. Thus, for example, if a man leaves the service within two years of the accident which disabled him, he will be entitled to the full pension. If he leaves within three years, the pension will be reduced to 87.5 per cent. If he leaves after five years or more the pension will be reduced to 50 per cent.

The men will retain the same safeguard against premature retirement or discharge as they would have had, had they not been disabled and compromised their compensation claims. Consideration will be given to the payment of solatium pensions to workmen who compromised their claims in the past.

#### Johannesburg-Pretoria Electrification

The completion of the railway electrification of the Witwatersrand was marked by the opening of the Johannesburg-Pretoria service on November 7. On the previous day a test train was run, the journey to Pretoria occupying 1 hr. 18 min. and the return journey a little over the hour. It is expected that in the near future, the run will occupy not more than 55 min. A partial service comprising three trains each way daily is now in operation; steam trains will be gradually reduced until a full electric service is in operation.

### UNITED STATES

#### New Seaboard Railway Diesel Trains

On December 15 a new diesel-electric train service, to be known as the Orange Blossom Special, is to come into force on the Seaboard Air Line Railway in the South-eastern States. In April next diesel-electric locomotives are also to be used on the South Eastern States Special, the night service between the Eastern cities and the Carolinas, Georgia, and Florida. The Orange Blossom Special stock is fitted with Tightlock couplers, and rubber draft gear. Its 13 Pullman and dining car trains will be hauled by three-unit 6,000-h.p. streamline locomotives, the actual power being developed by six 1,000-h.p. diesel engines, two in each unit. The three units together are 210 ft. long and weigh 450 tons; they carry 3,600 gal. of fuel oil and 3,300 gal. of water for cooling the engines and heating the trains. Each engine has 12 8½-in. bore x 10-in. stroke cylinders arranged V-wise, and drives a 600-V. generator providing power for the two motors, which are mounted on each of the six-wheel bogies, each unit being carried upon two of the latter. These trains run between Washington and Southern Florida, with two intermediate fuel stops only.

### INDIA

#### Railway Labour Conciliation

As previously announced in these columns a Railway Conciliation Officer had been appointed to deal with railway disputes in Calcutta, and the Railway Board had decided to set up an Industrial Advisory Board there also. This board has now been constituted under the presidency of Sir Zahid Suhrawardy, assisted by two members selected by him, one from a panel of members representing the employers and the other from a panel representing the workers.



On receipt of any reference from the Conciliation Officer, the Chairman of the board will normally conduct a preliminary investigation with a view to determining whether the dispute warrants the board's consideration; and whether there has been a definite failure to reach an agreement outside the board. The decision of the board would normally take the form of a report to the Railway Board or the head of the railway concerned, with recommendations where necessary. Copies of the findings will be supplied to both parties. It would be open to the Chairman to suspend the inquiry if during its pendency a stoppage of work occurred.

## CEYLON

### Coast Erosion

Part of the railway along the coast from Colombo to Galle has been threatened by erosion by the sea since the break of the monsoon. The Engineering Department is, therefore, engaged in strengthening the stone protecting groynes with sheet steel piling and by other means. As the ocean currents are affected by the uncertainty of the monsoon, the problem of protection from sea erosion in Ceylon is a difficult one. Effective protection could be ensured only by deflecting the currents, but this would involve prohibitive expense, and therefore the somewhat vulnerable system of groynes is retained.

## ITALY

### New Coaching Stock

The following new bogie coaching stock is expected to be delivered by Italian firms to the State Railways in the near future: 150 first and second class coaches, 28 sleeping cars, and 750 third class coaches with upholstered seats. The sleeping cars will accommodate 20 passengers, and carry a conductor, who will have a small bar from which he can serve them. In addition, 80 second and 120 third class four-wheel coaches are under construction.

## NORWAY

### Trial of Danish Diesel Train

On October 31 a Danish diesel-electric train ran under its own power via the Elsinore-Helsingborg train ferry for trial on the Norwegian State Railways. The unit is a new train, just out of the shops—Frichs of Aarhus for the power equipment and Scandia of Randers for the coaches—and destined for service on the Danish State Railways after its visit to Norway. It made trips between Oslo and Bergen, Oslo and Trondheim, and Oslo and Kristiansand. The last-named trip, normally taking a steam train about 8 hr., took 4 hr. 40 min. On the Bergen run the single journey took 6 hr. 55 min., as against 11 hr. by steam train, and a steady speed of

about 37 m.p.h. was maintained on the long 1 in 50 gradients.

## NEW ZEALAND

### Railway Progress

In the October 1 issue of the *New Zealand Railways Magazine* is published a General Manager's message descriptive of the progress and development of his system during the past 40 years, and illustrated by the chart reproduced below. Other items of interest in the message are:—

	1898	1938
Growth of passenger traffic: journeys ...	6,708,725	22,441,212
Cost of coal consumed ...	£48,820	£690,029
Other stores used ...	£207,000	£905,694
Total wages bill ...	£623,267	£4,902,226
Goods tonnage handled ...	2,628,746	7,516,049
Heaviest locomotive ...	63 tons	136 tons

From the chart below it will be noticed that there has been a great increase in density of traffic, seeing that the train-mileage has increased since 1898 in the ratio of  $3\frac{1}{2}$  to 1, whereas the route-mileage has expanded only in the ratio of  $1\frac{1}{2}$  to 1.

Mr. Mackley calls attention to the fact that 40 years ago there were no Westinghouse brakes, tablet system, electric headlights, automatic signaling, electric train lighting, sleeping cars, steam heating of trains, railcars, or electric trains, as there are today.

## SWITZERLAND

### Developments on the Federal Railways

Beside the various works of major importance referred to from time to time in these pages, the Federal Railways are gradually improving their lines in less noticeable respects. Total or partial reconstruction of smaller stations is regularly pushed forward, and in many recent instances the practice has been to provide island platforms on double lines. Relaying is undertaken to the extent of some 60 to 70 km. yearly, the rails now laid on main lines being 24 m. (78 ft. 9 in.) in length and weighing 40 kg. per m. (80 lb. per yd.). Opportunity is taken whenever possible to realign curves for higher speeds and smoother riding. There are still numerous stations on main routes through which speed has to be reduced on account of the sharp turnouts, but these are gradually being renewed with flatter points and crossings, enabling trains to pass through at 100 km. (62 miles) p.h. and railcars up to about 120 km. (75 miles) p.h.

The use of colour-light signals has been greatly extended, particularly for distant signals, attention having been given in the first place to positions where visibility is poor, rather than to complete the equipment of whole sections as is usually the case elsewhere.

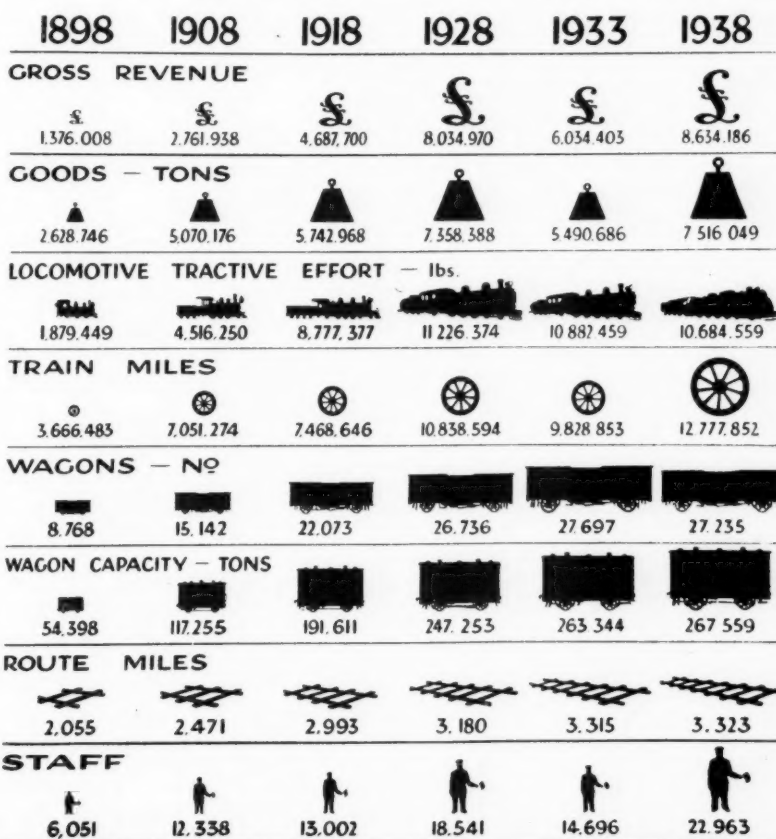


Chart showing 40 years' progress, N.Z.R.

Stations having complete colour-light installations are Basle (Federal), Brugg, Zurich (Hauptbahnhof), Winterthur, Sargans &c. There are also partial installations at Lucerne, Weesen, and a few other points. In most recent instances of power equipments at junction stations, the signal-box is placed on a bridge spanning the main tracks; this is the case at Zollikofen, Zurich-Wiedikon, Wädenswil, Pfäffikon, and Sargans. At smaller stations, where the frame and block instruments are fitted on the platform outside the station-master's office, they are still unprotected in many cases, but whenever a station is taken in hand for other improvements, the signalling equipment is enclosed in a glass and metal shelter.

#### The Hauenstein Lines

For the first time a Swiss double-track route is being converted to single-line. This is the Sissach—Olten section, 17.6 km. in length, which was opened in 1857-8 as part of the Basle—Olten main line of the Schweizerische Centralbahn, and was double from the outset. The line is steam-operated, and is only used by local trains. There is an ascent with a steady 2.08 per cent. (1 in 48) gradient from Sissach to Läufelingen on the north side, and on the southern incline, on which is the older Hauenstein tunnel (2.5 km., 1½ miles), the maximum gradient is 2.62 per cent. (1 in 38). The need for an easier route was felt as soon as traffic developed, but the present main line *via* Gelterkinden, with the Hauenstein base tunnel (8.1 km., 5 miles) between Olten and Tecknau, was not opened until 1916. A metre-gauge electric railway which had connected Sissach with Gelterkinden since 1891 was then closed. The main line was electrified in 1924.

### SPAIN

#### Proposed Zamora-Corunna Railway

Construction work is progressing on the Corunna—Santiago or northern section of the projected Zamora-Corunna railway. This section, which is broad gauge, is 74 km. (46 miles) in length and will give Santiago a second outlet to the sea at the busy port of Corunna, as well as providing through communication between the ports of Corunna and Vigo. When this line is finished the distance between Corunna and Vigo will be 180 km. (112 miles) by rail, and it is intended to establish a service of railcars which will perform the journey in three hours. The existing line between Santiago and Pontevedra was constructed by British interests and was operated by the West Galicia Railway Company, until it was merged with the neighbouring Orense-Vigo Company in the amalgamated lines making up the National Western of Spain. At present the gap between Santiago and Corunna is covered by a motor bus service. The projected line from Zamora will provide an alternative and shorter route from Madrid to the Pro-

vince of Galicia, it will be some 740 km. (459 miles) in length, compared with the Northern Company's 831-km. (516-mile) line *via* Leon. The route as at present proposed is as follows: Zamora, Puebla de Sanabria, Orense, Carballino, Lalin, to Santiago, and thence through Ordenes to Corunna.

#### Moncada Link

A Decree dated October 8, published in the official *Gazette of the Republic* of October 11, approves the construction by the administration, under the direction of the National Railway Council, of a branch line to connect the existing Moncada junction, on the Zaragoza—Lerida—Barcelona line of the old Northern Company, and Moncada at km. 115.5 of the Barcelona—Granollers line, with the object of providing a connecting link between the two lines. This connection has been talked of for many years and has already been approved



Sketch map showing Moncada link

once before (on October 25, 1932), but the companies then concerned did not see their way to carry it out. The estimated cost of construction is 1,339,700 pesetas.

### DENMARK

#### Rearrangement of Stations in Hjørring

At present there are two stations at Hjørring in northern Jutland, a State Railways station on the main line from Frederikshavn to Aalborg, and another serving the three company-owned railways starting from that town. Agreements have now been made to close the latter, and the three private railways will in future use the State Railways station. The scheme,

which incorporates considerable street rearrangements, bridge building and extensive track rearrangements, is estimated to cost Kr. 2,000,000, of which the State is to provide Kr. 170,000, the town Kr. 330,000, and the private railways between them the balance. The works will be carried out by the State Railways.

#### New Works in 1939-40

In the State Railways budget for the year beginning April, 1939, a sum of Kr. 1,000,000 is allowed for modernising the repair shops at Aarhus. In all about Kr. 4,000,000 will be spent on these works, where a special diesel motor repair shop will be erected. The repair shops in Copenhagen will also be modernised and extended during the coming years. Of the total cost of Kr. 4,300,000, about Kr. 1,000,000 is expected to be spent in 1939-40.

In accordance with the law passed in the Rigsdag to reduce unemployment, the State has granted a sum of about Kr. 30,000,000 to assist the State Railways in carrying out the bridge- and earth-works for the doubling from Randers to Aalborg, a distance of 81 km. (about 50 miles). In 1939-40 platelaying will begin, and a sum of Kr. 1,000,000 is allocated for this purpose.

Upon the electrification of the Valby—Ballerup (Copenhagen) suburban line now in hand, a sum of Kr. 1,500,000 will be spent in 1939-40. The project includes the lifting of the railway from Vanløse to the outskirts of the city, to enable four main roads out of Copenhagen to be carried under the railway. A substantial grant will be made from the Road Fund towards the building of the four bridges over the roads.

For rolling stock a sum of Kr. 9,500,000 is allocated, of which about Kr. 2,500,000 will be devoted to compressed air brake equipment, and Kr. 1,000,000 to the purchase of goods wagons from the private railways. An agreement has been reached between the private and the State Railways, by which the use of private railway goods wagons on the State lines will be very much restricted. At present many private railways only about 20 miles in length send their goods wagons under load to the State lines, where they probably run hundreds of miles. For this the private railways obtain good payment. After the new agreement comes into force the private lines will have a surplus of goods wagons, which will be bought by the State Railways.

Finally a sum of Kr. 3,100,000 is allotted for the construction of a new train ferry for the Great Belt crossing. At present there are four modern diesel train ferries, one modern diesel motor-car ferry, and several older steam ferries, but the ever-growing traffic across the Belt necessitates the building of a new ferry.

## THE EVOLUTION OF THE DISTANT SIGNAL

(From a correspondent)

THE circumstances attending the Castlecrey accident on December 10, 1937, on the L.N.E.R. emphasised the key position of the distant signal in train running. A few notes on the evolution of that signal may therefore be of interest. In the early days of railways, of course, speeds were not high and safety depended upon a driver sighting an obstruction or a signal to stop in sufficient time, and acting promptly so as to pull up short of the danger point. The first fixed signals are said to have been introduced in 1834 on the Liverpool & Manchester line, and were placed at stations and crossings, but there seems to have been no thought at that time of assisting the driver by an advance warning of a stop signal.

### The First Distant Signals

Probably the first reference to a signal to be worked at a distance from a station was in "Curtis's Inventions," published in 1840. This interesting signal, described in THE RAILWAY GAZETTE for July 16, 1937, was really based on the same general principle as our present-day signals. Railway authorities apparently did not share Curtis's views on the need for such a device and there is no record that his signal was ever used.

Credit is usually given to the North British Railway as being the first in Great Britain to use signals worked at a distance, at the opening of the junction of the Hawick branch with the Edinburgh—Berwick main line in 1846. An employee of the line named Skeldon was awarded a medal in connection with this by the Royal Scottish Society of Arts in 1849.

Signals of this kind, intended to protect a point of danger some distance off, were at first called "auxiliaries" and were frequently to be seen by 1850, save on the Great Western where the lofty cross-bar signals (many 60 ft. high) visible at a considerable distance, rendered the necessity less urgent. In the first published issue of the official requirements (1858) reference was made to the need for "distant" signals.

### Safeguards

There was, as late as 1874, considerable diversity of practice regarding the working of the "auxiliary" or "distant" signals, as they had begun to be called, some lines working them merely as outer signals independently

of the "main" or home signals, in accordance with the original idea, others making them repeat the home signals, a practice for which many drivers who gave evidence before the Royal Commission appointed in that year pressed. Interlocking was then used to compel the signals to be worked correctly. Slotting is said to have been first applied on the London & North Western, and many distant signals were formed by merely slotting the next stop signal in rear, a confusing practice. The use of the lower distant arm, slotted with the one above it, came later. Signal arm and light repeaters were introduced during this period.

### The Notched Arm

The block telegraph began to come into general use in the early seventies, although its principles had long been known, superseding the time interval system, under which an "auxiliary" signal, when "on," required a stop to be made, either at it or at any point within it. There were three-position "auxiliaries" on some lines. With the extension of block working the original function of the distant signal was lost sight of and it became a cautionary warning. A distinction between stop and distant semaphores became necessary and the notched arm was introduced by Williams, a Superintendent of the Brighton Railway, but this practice was at first, it is said, used only where signals were numerous. Nevertheless it was eventually followed by all the railways. Little effort was made to make any distinction during darkness, although suggestions for flashing lights and other devices were made from time to time, until the beginning of this century, when the luminous fishtail lantern was introduced and eventually adopted by the three lines now forming the Southern, and by the Great Eastern. This again disappeared with the adoption of the yellow light, first seen in this country when the District Railway was electrified, and adopted near London on the Great Central during the war. The Great Western and Great Northern subsequently took the same step, but there was some further delay before it became general practice. The Great Western was the first line in this country to adopt distant signal "interlocking" or proving, in conjunction with the block, as a regular practice, and introduced an audible distant cab signal in 1906, from which its A.T.C. system was developed.

## FRANZ XAVER RIEPL

### *Some notes upon the career of an Austrian railway pioneer*

IT is strange that a man who played as prominent a part in general industrial, as well as railway, development as the Austrian railway pioneer, Franz Xaver Riepl, should for so long have been practically forgotten. Although he was as well known at one time as Friedrich List, the great advocate of railways in Germany, his name fell right in the background; his grave was neglected; and his numerous plans, sketches, and writings have disappeared. Yet he was advocating steam railways on a large scale before List, when the earliest experiments were being made in England, and the Budweis—Linz horse railway was unfinished.

Riepl, like List, had considerable foresight and advocated the national and comprehensive planning of a rail-

way system as a general means of transport, rather than the construction of isolated lines. Industrial undertakings were more numerous and developed in Austria than in other German countries in Riepl's time and it was because of his association with them that he was led to interest himself so much in transport problems. Disappointment drove List to suicide, but Riepl lived to see his exertions rewarded. The latter's work has formed the subject of an article by Dr. F. W. Garbeis in the *Zeitung des Vereins*, and the following details are extracted therefrom.

Franz Xaver Riepl was born at Graz on November 20, 1790, and studied at the University there under Mohs, an eminent geologist of the time. He took up prospecting and mining in the Steiermark districts, and strongly advo-



cated that the State should make a complete survey of its mineral resources. Riepl's mind was essentially synthetic; he realised the interdependence of all branches of science and the practical purpose of theoretical study. He early appreciated the importance of coal as fuel and the role of coke in industry; some early coke ovens were due to him and he introduced improvements in smelting processes. Becoming a professor of mineralogy in Vienna he made journeys abroad to study industrial processes and soon saw the advantages that cheap and easy transport, both for raw materials and finished products would bring.

The Mährisch iron industry needing better communication with the Silesian coal deposits, Riepl planned some mining railways and eventually proposed a 450-km. (280-mile) railway from Vienna to Bochnia in 1829, the same year that the Rainhill trials were held in England. In 1830 he suggested the Brody—Vienna—Trieste line, 1,500 km. (932 miles) long, which naturally evoked much criticism. Contemporary statements say that these proposals were not a mere rough idea based on little more than a line on the map, but that Riepl worked out full details of construction, route, materials, and equipment, and gave calculated rates for charges and expected financial return, and it was this careful work that secured the admiration and attention of some thoughtful men. Riepl issued a "Memorandum on the advantages and requirements of a complete railway system for Austria" in 1836—after working at it for 6 years—and the knowledge and foresight displayed therein were afterwards seen to be most remarkable.

Riepl was fortunate in living to see railway lines opened which he had proposed, the first forming part of the Kaiser Ferdinands Nordbahn. The principal sources of revenue had been rightly thought to lie in goods traffic, although coal was little considered. Nevertheless Riepl, in the memorandum above quoted, wrote, "If one considers that the line from Ostrau to Galizia passes for a distance of 60 km. (37 miles) either through or alongside the coal mines, and that already many railways live on transporting nothing but coal, there seems little doubt that this material will very soon be the most important article of freight on the projected line." By 1880 coal formed practically half the goods traffic on the Nordbahn.

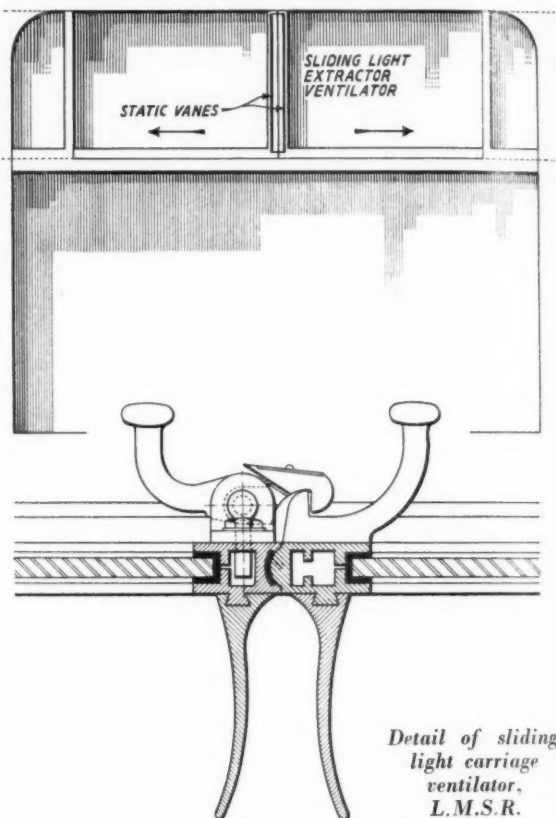
Riepl remained a member of the Nordbahn board until his death at Vienna on April 25, 1857. The Chairman, Josef von Stummer, speaking of his services, said, "In a time when railways were considered the illusion of dreamers he was able to bring the locomotive to this country, against all doubts and probabilities. No unfavourable opinion from the understandable wavering of the early days could mislead him, for he saw the successful outcome of the step with a far viewing eye as bound to come, and he had the happiness to see the fruits of his efforts reaped to the full in compensation for the many vexations he had to put up with. The Nordbahn has to inscribe his honoured name on the first page of its history."

It was decided to have a bust of Riepl placed in the Nordbahnhof at Vienna, where one may still see it. In 1904 the Vienna municipality named a street after him. His remains were first interred in the old St. Mark cemetery, but in 1905, at the request of some descendants of his, they were removed to the family vault in the mountain cemetery at Hinterbrühl, a health resort near Vienna. Recently the Austrian Federal Railways (now incorporated in the Reichsbahn) had his gravestone renewed, and a memorial ceremony was held there during the Austrian railway centenary celebrations early this year.

## CARRIAGE VENTILATION ON THE L.M.S.R.

*The latest standard sliding light extractor ventilators on L.M.S.R. coaches have proved effective and serviceable*

**A**DOPTED as standard for the latest L.M.S.R. stock, the sliding light extractor ventilator, shown in the accompanying diagrams, consists of two small fixed lights, secured by the bodyside panelling in such a manner as to allow of the retention of the standard flush exterior finish, and two lights, each fitted with a deflector



vane, which slide right and left into pockets in the bodyside framing. In a paper to the Institute of Transport entitled "Amenities of Railway Passenger Travel" which was reported in THE RAILWAY GAZETTE for April 15 last (page 767), Sir Harold Hartley said that, in a train travelling at 65 m.p.h., the new ventilators extracted air at speeds up to 610 ft. per min. at 3 in. from their leading edge. This compared with 2,000 ft. per min. inrush of air through an ordinary drop window open 3 in.

Trials have proved this type of deflector to be only slightly less efficient than that in the earlier pattern lights in which the vanes, hinged to their respective sliding light framing to allow one or the other to open or close by air pressure, became damaged by cleaners' brushes.

Springs to obviate rattle, and rubber gaskets to eliminate draughts, are refinements in the new fitment, which is supplied by Worcester Windshields and Casements Limited. The use of extruded sections has resulted in a considerable saving in weight.

## NEW 4-8-2+2-8-4 BEYER-GARRATT LOCOMOTIVES FOR THE S.A.R.

*These locomotives are conspicuous for their exceptional hauling power on 60-lb., 3-ft. 6-in. gauge track, their unusual weight distribution, and in being the first Beyer-Garratt engines to use an auxiliary water tank*

**A**N order for 16 Beyer-Garratt articulated locomotives, embodying many unusual features, has just been completed at the works of Beyer, Peacock & Co. Ltd. for the South African Railways. Already several are in traffic and before describing them in detail brief reference may be made to the conditions of service for which we understand they have been purchased.

Some eighteen months ago traffic had grown so rapidly on the Johannesburg—Zeerust—Mafeking line that some means of quickly increasing its capacity became of paramount importance. This line branches off the Johannesburg—Kimberley main line some 20 miles west of Johannesburg, and from the junction the track is single and laid with 60 lb. rail. The section from Johannesburg to Zeerust, a distance of 149 miles, is the most difficult as here a considerable mileage consists of 1 in 40 grade, associated with numerous curves some as sharp as 500 ft. radius. An idea of the profile can be gleaned from the fact that after leaving the Reef at an elevation of 5,700 ft. the line at a point 20 miles further on has fallen to a level of 4,600 ft., whilst in the next 11 miles it again reaches over 5,000 ft. to be followed later by a drop to 3,585 ft. Loaded traffic is greater in the Zeerust—Johannesburg direction which also contains the heaviest bank, namely, 20 miles of almost continuous grade, much at 1 in 40.

Various methods of increasing the capacity of the line were accordingly considered, such as relaying with heavier rail or realignment or doubling, or some combination of these alternatives. The main factor was, however, the urgency for providing the earliest possible relief to traffic congestion, and for this reason the decision was made to purchase the Beyer-Garratt locomotives about to be described. These engines have, we believe, the highest tractive effort ever placed on 60-lb. rails anywhere in the world, namely, 60,700 lb. at 75 per cent. and 68,800 lb. at 85 per cent. of boiler pressure. In order to obtain the maximum power, certain increases in weights on the coupled wheels were permitted, the maximum being 15 tons on the drivers; this concession was, however, accompanied by a reduction in the weights usually allowed on the bogies, and a restriction in reciprocating balance was also considered desirable. The unusual weight distribution, particularly for a Garratt locomotive, and the necessity for ample water capacity, while permitting increased power, necessitated the provision of an auxiliary water tank, the hind unit of the engine being used solely for coal and the front tank carrying sufficient water for shunting purposes when the engine is detached from its tank.

These Beyer-Garratt engines and auxiliary tanks have been built to the designs of Mr. W. A. J. Day, Chief Mechanical Engineer of the South African Railways and Harbours. They provide an example of the latest South African Railway practice combined with modern Beyer-Garratt engine development as recommended by Beyer, Peacock & Co. Ltd. Care has been exercised to incorporate in the design many details and parts that are interchangeable with items on other classes of locomotives of recent design. The sixteen auxiliary water tanks, similar to the latest type in service, have been built at

the Pietermaritzburg shops of the South African Railways near Durban to which point the locomotives were shipped for erection.

Garratt engines have been at work on the Johannesburg—Zeerust line for many years past, but the new engines should provide an increase in the capacity of the line in the region of 50 per cent., and we are informed that loads as high as 750 tons as against 450 and 500 tons hauled by the two classes of Garratt engines previously employed, have already been satisfactorily handled. In view of the arduous nature of the line, one bank entailing 75 minutes continuous steaming, the largest possible boiler has been arranged, combined with a mechanical stoker, thus facilitating maximum boiler output.

### General Design

From the various illustrations and line diagram reproduced herewith a good idea can be obtained of the proportions and general details of the engine. For the sake of ready reference we give below the principal leading dimensions:—

Cylinders (4), dia.	20½ in.
stroke	26 in.
Piston valves, dia.	11 in.
max. travel	6½ in.
Coupled wheels, dia.	4 ft. 6 in.
Evaporative heating surface, tubes	2,771 sq. ft.
firebox (including two syphons and two arch tubes)	279 sq. ft.
Total	3,050 sq. ft.
Superheater (inside)	770 sq. ft.
Combined total	3,820 sq. ft.
Grate area	63.4 sq. ft.
Boiler pressure	200 lb. per sq. in.
Coal capacity	10 tons.
Tractive effort (at 75 per cent. boiler pressure)	60,700 lb.
85	68,800 lb.
Weight of locomotive in working order	175 tons
Water capacity, engine	1,600 gal.
auxiliary tank	6,750 gal.
Total water capacity	8,350 gal.
Total weight of locomotive and auxiliary tank	225 tons

Special attention has been paid to reducing the engine-men's work in preparing and operating the locomotive; roller bearings fitted to all bogie wheels, and grease lubrication to the coupled axleboxes and other points, and a mechanical stoker, help considerably to this end.

The engine units have bar frames 4 in. thick and 33 ft. 7 in. long, made from rolled steel slabs and bound together by massive steel castings. The boiler is carried in a plate frame cradle of the general type introduced by the maker, the extremities being supported on articulating pivot centres of cast-steel construction. The side bearers are of the roller type. In view of the length of the boiler cradle frame and the tortuous nature of the line, the front pivot has been made hemispherical, the hind one being of the flat oil-bath type. It may here be mentioned that the locomotives have been designed and actually tried in the works, where we recently inspected them.

on a curve of 275 ft. radius having  $4\frac{1}{2}$  in. superelevation. The spherical pivot side rollers are of course spring loaded.

As will be noted, the locomotive is of the 4-8-2+2-8-4 wheel arrangement, and a point of special interest is the large diameter of coupled wheel, namely 4 ft. 6 in. It may be recalled that not only the early Garratt but also ordinary locomotives had very much smaller wheels for such duty as the new engines are called on to perform, subjecting them to very severe strains. The advantages of the large wheel may therefore be expected to be reflected in a lowering of maintenance costs and the rendering of the locomotive suitable for passenger work as well as freight.

#### Boiler Details

The boiler, although conforming to the usual type associated with the Garratt engine, has many interesting features apart from its remarkable size for a 60-lb. rail laid to the 3 ft. 6 in. gauge. The diameter of the barrel outside is 7 ft. 3 in., and the distance between the tube plates 13 ft.  $6\frac{1}{2}$  in. Despite these dimensions the boiler centre, it will be noted, is only 8 ft. 6 in. from rail level. The barrel contains 50 tubes  $5\frac{1}{2}$  in. outside diam. and 255 2 in. outside diam., all of steel. The superheater tubes are  $1\frac{1}{2}$  in. outside dia., of the Melesco type manufactured by the Superheater Co. Ltd. The boiler barrel and firebox shell wrapper plates are of nickel steel, and the inside firebox, which is of the round-top type, is of steel plates to S.A.R. specification and manufactured by Colvilles Limited. Each firebox is fitted with two Thermic syphons made of Colvilles' double crown brand steel, and also two arch tubes. The arch tubes are expanded into Noble's ferrules. The smokebox tubeplate and firebox shell back plate are stayed to the boiler barrel and firebox shell wrapper by horizontal plate gusset stays and angles, the usual longitudinal stays being dispensed with. Flexible stays to S.A.R. standard drawings have been fitted in the breaking zones and also to the front rows of firebox crown stays, which can be clearly seen in the illustration. For tube cleaning, two Clyde Superior tube blowers are located one on each side of the firebox. Three 4 in. diam. Ross pop safety valves are provided. In our illustration of the cab can be seen, behind the safety valves, one of the two large steam turret castings to which all steam valves are fixed; these are operated by hand-wheels made of brass pressings. The regulator is of the multiple-valve type manufactured by the Superheater Co. Ltd., with the valves on the saturated steam side of the header in accordance with South African practice. Adequate drainage from the header is provided to discharge through the smokebox side on to the track. Steam is taken from the dome by a 7-in. diam. internal steam pipe from a standpipe in the dome.

The large firedoor opening for the mechanical stoker will be noted. Two of the locomotives are fitted with the Superheater Company's steam-dryer arrangement in the dome. In the smokebox there is a self-cleaning spark arrester of the S.A.R. perforated plate type with deflector plates. The blast pipe cap is fitted with Goodfellow tips. An ash ejector is also provided. The boiler is clothed with J. W. Roberts' asbestos mattresses, and the clothing plates are of planished steel with stainless steel belts. Two No. 12 Gresham & Craven injectors feed the boiler, the water being delivered through a double top-feed clack-box. The incoming water enters the boiler through a spray nozzle beneath which is a baffle tray designed to allow the air to escape and thus prevent corrosion of the boiler tubes at this point. Nos. 15 and 16 of the series are fitted with a Davies & Metcalfe exhaust injector in place of a live steam injector. The positions of the in-

jectors have been very carefully selected, and, as will be observed from the illustrations, are located on the boiler cradle and as low as possible to enable the lowest possible water level to be taken from the auxiliary water tank on a 1 in 40 grade. A special water feed-box has been designed so that water can be taken either from the front tank or auxiliary tank as required, the control for this being located in the cab. Two Everlasting blow-off cocks are arranged one on each side of the throat plate. An inspection manhole, in accordance with South African practice, is fitted on top of the barrel between the dome and firebox wrapper plate.

The grate, which is of the rosebud type, is arranged for hand rocking and built in six different sections. A drop grate is also fitted. The reason for the rocking grate being divided up into small areas is to enable the thinner fire carried in mechanical stoking to be dealt with in sections according to its unevenness, and this, we are informed, has been found to be very effective.

The ashpan is of the self-cleaning type with large emptying doors operated by a small steam cylinder and arranged to discharge the ashes between the rails. No dampers of the usual type are fitted to the ashpan, but, as will be seen in the illustrations, there is a clear space between the top of the ashpan and the foundation ring about 6 in. deep, which is permanently open for air access. The ashpan is fastened to the cradle frame, thus permitting the lifting of the boiler without disturbing the ashpan.

#### Engine Units

As already mentioned, the coupled wheels are of 4 ft. 6 in. dia., those of the four-wheel bogies 2 ft.  $4\frac{1}{2}$  in. and the inside carrying wheels 2 ft. 10 in. The four-wheel bogies, of swing link type with spring control, are fitted with British Timken roller bearings and axleboxes, and the inner trucks with Skefko roller bearings. Tyre watering is applied to the outer wheels of the four-wheel bogies. The coupled axleboxes are of solid bronze and fitted with Ajax patent hard grease lubrication, whilst the coupled wheels have Ajax soft grease nipples for the hub faces. The brake and spring rigging is lubricated with soft grease, as is the valve motion to be mentioned later. The springs are above the frames, and the usual type of spring saddle is fitted between the spring buckle and the top of the axleboxes. The whole of the coupled wheels and the inner truck on each unit are compensated in one group in accordance with South African practice, and the spring links are fitted with a special type of pin standard to the railway. Each unit is fitted with a steam brake, and the front unit has in addition one vacuum cylinder which operates in conjunction with the train brake. The vacuum brake is controlled by a Davies & Metcalfe latest pattern ejector. There is also a hand screw brake applying the blocks to the coupled wheels of the hind engine unit. Sanding arrangements comprise feeds to the front and rear of each group of coupled wheels, the operation being by small steam cylinders coupled direct to the actuating rods of the valves.

#### Valve Gear and Front End

The cylinders are of cast iron, each cylinder cast with a half frame stay, the two being bolted together on the centre line, thus forming a very rigid construction. The cylinders are fitted with cast-iron liners, and the hind covers are made of cast steel. Both front and hind steam-chest and cylinder lagging covers are made of stainless steel. The drainage arrangement consists of three cocks per cylinder actuated by servo-motor. The pistons are fitted with three narrow rings of  $\frac{3}{8}$  in. width, and the piston rod packing is supplied by the United Kingdom Metallic Packing Co. Ltd. Piston valves of

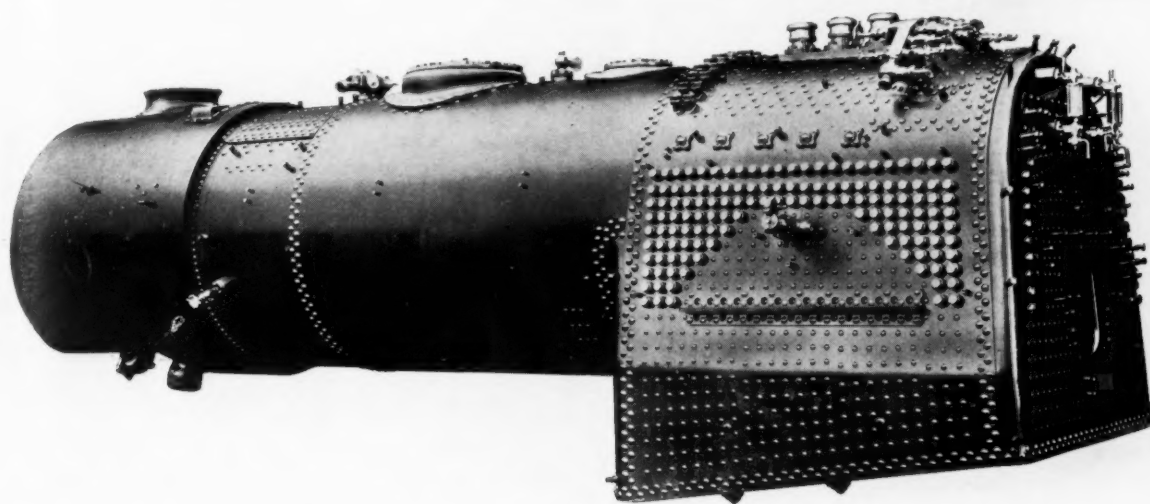


11 in. dia., designed for inside admission, are of the four-ringed type, and the valves actuated by Walschaert gearing have a travel in full gear of about 6½ in. Provision for coasting on the cylinders is by Hendrie bye-pass valves and an air valve on the steamchest, whilst a Sellar's steam drifting valve is fixed on the firebox and operated from the driver's position in the cab.

The valve gear is noteworthy for its layout, particularly as regards length of radius and eccentric rods. The connecting rods, 12 ft. 0 in. long, of Tormanc steel manufactured by the United Steel Companies Limited, are fluted and fitted with floating bushes. The return cranks and the expansion links at the eccentric rod end have Fischer roller bearings; the remaining bearings of the valve gear have bronze bushes. The bearings of the whole valve gear are fitted with soft grease nipples. A further point of interest is that the quadrant block in the link

access to the bunker is provided by means of a door. Handrails are of stainless steel.

The main item of interest is perhaps the mechanical stoker which is of the H.T.-1 type made and supplied by the Standard Stoker Company, of America. The great improvement in mechanical stokers in recent years will be apparent, the fitting now being located very much lower and causing practically negligible obstruction to the engine-men in passing from one side of the cab to the other. The conveyor is of the usual screw type, and the distributor head has five jets operated by steam taken from a manifold in the cab, which can be clearly seen. The five controls are marked as follows: Left Back, Left Front, Fine Coal, Right Front, and Right Back. The stoker is capable of delivering 15,000 lb. of coal an hour, thus ensuring the highest possible firing rate. A fire screen protects the driver. The stoker engine, a totally enclosed



*Boiler of the new 4-8-2+2-8-4 Beyer-Garratt locomotive for South Africa*

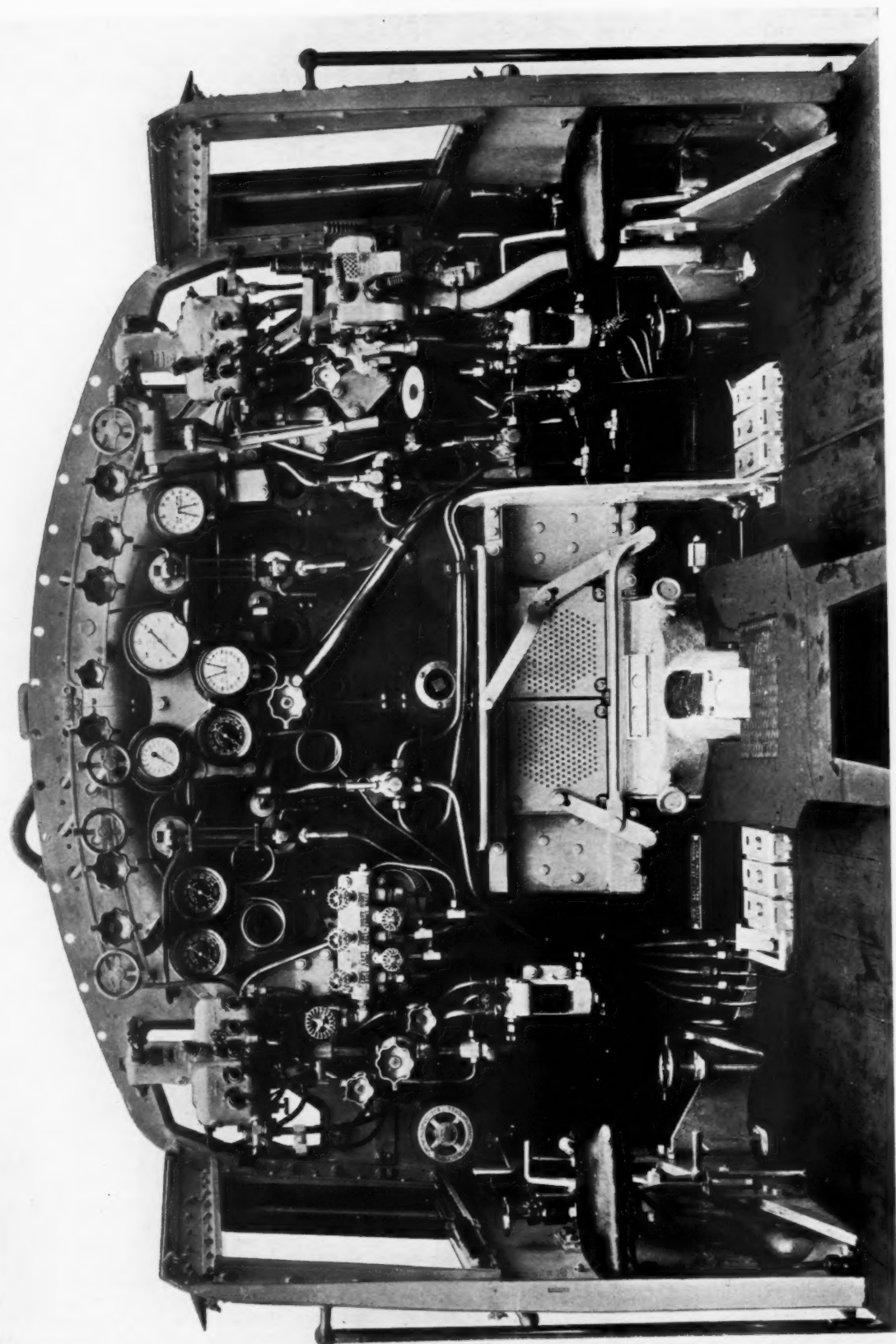
is made of bronze. The valve gear is reversed by steam and controlled by an oil cataract locking cylinder as has been standard on the South African Railways for many years. The crossheads are of the Laird type, with cast-iron slippers having white metal lining and brass side liners. They are fitted with lubricators feeding internally to the bar, and felt pads are arranged at each end of the slippers to keep the bars clean and confine the oil to the slippers. The percentage of reciprocating weights balanced on these locomotives is 26 per cent., divided equally between the coupled wheels.

#### **Cab Fittings**

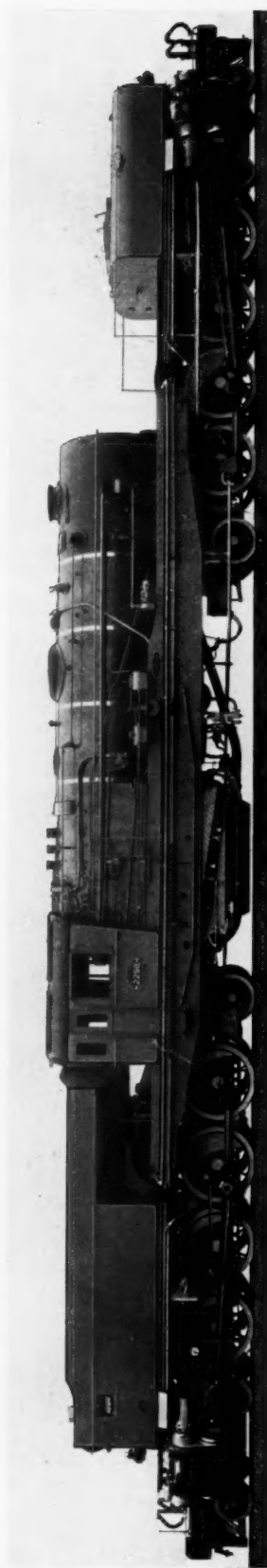
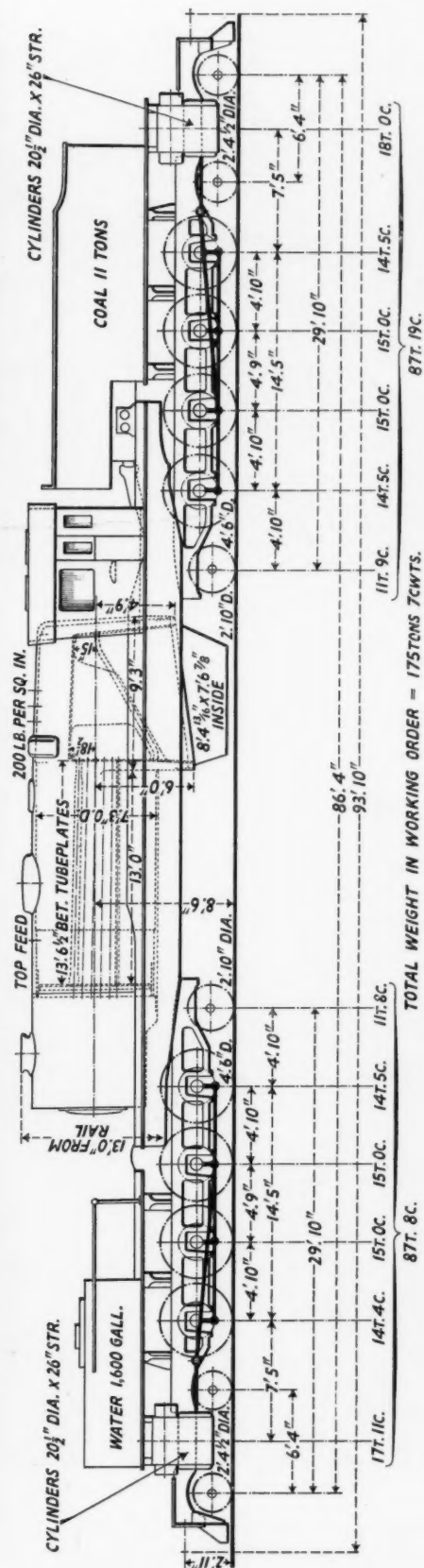
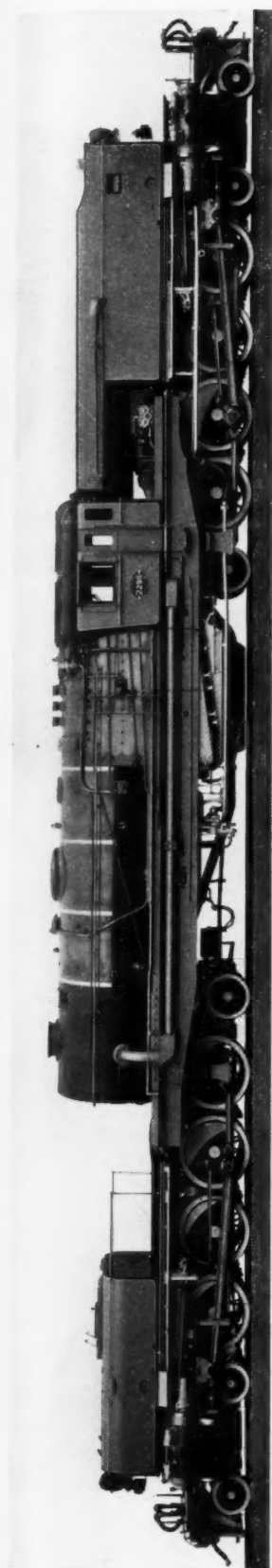
The arrangement of the cab fittings, which have been carefully selected and located, can be clearly seen in the illustration. As is perhaps known, despite the limits of the 3 ft. 6 in. gauge, the overall width at footplate level on the South African Railways is 10 ft., the actual cab width being 9 ft. 6 in. This, coupled with the Garratt form of construction, permits a very commodious cab providing the maximum comfort for engine driver and fireman. Cushioned drop seats and arm rests are provided for both driver and fireman. The windows are of the sliding type with dust and rain shields, and side entrance doors are fitted and arranged to give fully closed, half open, and fully opened positions. Large ventilators are provided in the roof and cab sides, while easy

double-acting two-cylinder variable-speed reversing steam engine, is located on the hind pivot casting. This stoker, which can be seen on the left-hand view of the engine, is easily accessible, while doors in the end of the hind tank give further accessibility to the screw conveyor. The grate is divided into hand-operated sections, and the sockets for the levers can be seen on the immediate left and right of the stoker.

Lubricators are of the hydrostatic sight feed type, the first 12 engines being fitted with Detroit and the remaining 4 with Wakefield Eureka fittings. The left-hand lubricator has five feeds, while that on the right is arranged with four. One feed from the five-feed lubrication goes to the stoker, and one feed from each lubricator to the steam ball-joints, whilst the remaining feeds go to the steam chest and cylinders, one of the latter being fed direct to the steam pipe before its entry into the steamchest. It may here be mentioned that the whistle is arranged near the smokebox to obviate noise in the cab. The various valve handles are fitted to rodding direct from the steam turret; the rods pass through a brass casting on which is cast the name of its particular function. The regulator handle is of the drop type with sector and placed on the driver's side of the footplate only. To the right of this can be seen the vacuum brake ejector and the steam reversing control with cut-off sector. To the left of the ejector there is a non-recording speed indicator



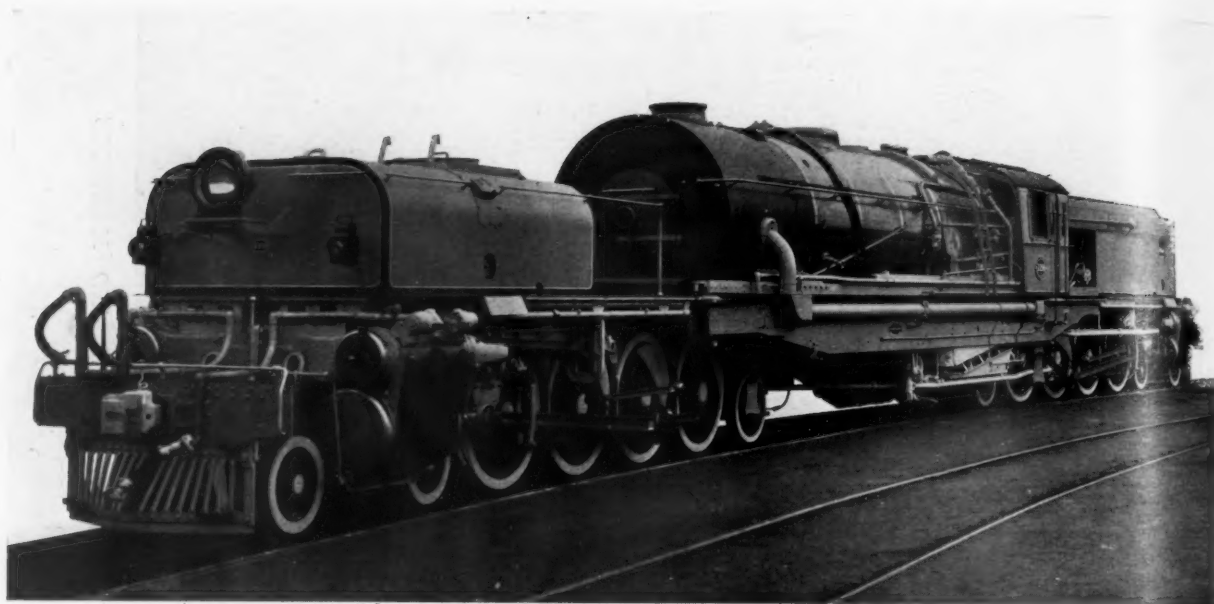
General view of footplate and control fittings



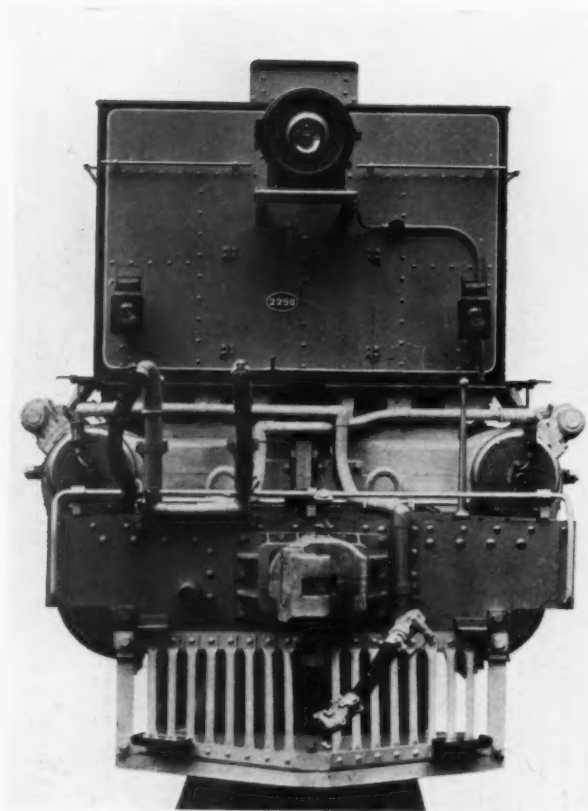
NEW 4-8-2 + 2-8-4 BEYER-GARRATT LOCOMOTIVES FOR THE SOUTH AFRICAN RAILWAYS AND HARBOURS

Gauge 3 ft. 6 in. Weight of rail 60 lb. Tractive effort (85 per cent. b.p.) 68,800 lb.  
Mr. W. A. J. Day, Chief Mechanical Engineer; Beyer, Peacock & Co. Ltd., Manchester, builder

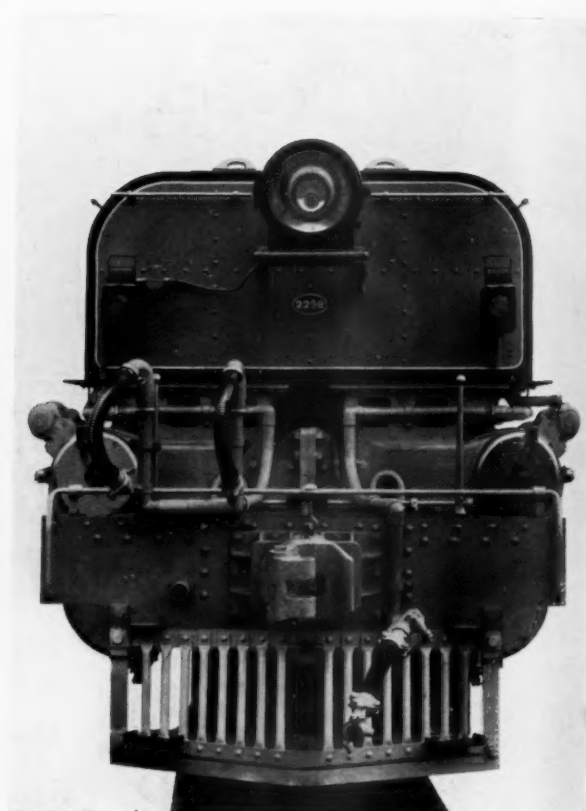




*Perspective view of locomotive at smokebox end*



*Rear end view*



*Front end view*

NEW 4-8-2 + 2-8-4 BEYER-GARRATT LOCOMOTIVE, SOUTH AFRICAN RAILWAYS

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*One of the new 4-8-2+2-8-4 Beyer-Garratt locomotives for the S.A.R. with auxiliary water tank attached*

of the Stone Deuta magnetic type driven by a torsionless drive from a gearbox mounted on a return crank. The speed indicators have an adjusting device for a range of wheel diameters and in particular to compensate for tyre wear. The electric lighting system, manufactured by J. Stone & Co. Ltd. consists of a 5-kW. set located on the right-hand side of the boiler cradle frame, and provides the usual lighting in the cab for gauges, &c., with an additional light in the back for lighting up the bunkers. Headlights are also arranged at each end of the engine.

Included amongst the various gauges are two indicating the steam pressures at the steamchests of the front and hind units. Other items of interest include steam-heating fittings manufactured by the Laycock Engineering Co. Ltd., and Alliance couplers fitted with Spencer-Moulton buffing springs. The cow-catchers are built up with tubing, and two shunter's steps are provided on them.

The general appearance of the locomotives, as the illustrations show, is impressive. Only the tanks and smokebox are painted black; it being considered that the planished steel clothing of the boiler, stainless steel

crinoline bands, stainless handrailing and cylinder covers give the necessary smartness in appearance. In the S.A.R. classification these new locomotives are known as Class "GM," and the road numbers run from 2291 to 2306.

Although the locomotive, which is 93 ft. 10 in. over buffer faces and 133 ft. 7 in. overall, with its tank, at first sight might be considered unwieldy, we understand that very little inconvenience is caused once a proper system has been introduced for dealing with the tank at running sheds. It is proposed to work the locomotives chimney first in both directions, the engine and tank being turned on a triangle at each end of the journey. The size and power of the locomotives are, of course, remarkable for the gauge and weight of rail on which they operate, and their conception, we consider, reflects great credit on the Chief Mechanical Engineer's Department of the South African Railways and on the maker.

The contract during manufacture was under the supervision and inspection of Mr. T. C. Swallow, Advisory Engineer of the South African Railways & Harbours in London.



*"Glass Age" design for Liverpool Street station, London  
(See editorial note on page 984)*

## MOBILE PERMANENT-WAY GANGS IN INDIA

*A considerable saving in wages is effected by this system on branch lines, judging from experience on the North Western Railway*

THE system of permanent way maintenance by mobile gangs equipped with trollies was introduced on the North Western Railway (India) as long ago as January, 1933. Certain sections of that long and most westerly branch of Indian railways, originally terminating in Persian territory and now worked only as far as Nok Kundi by two trains each way a week, were then affected. As a result the previous 43 mates, 43 keymen, and 291 gangmen required, gave way to only 15 mates, 24 keymen, and 125 gangmen, each gang having 1 mate, 2 keymen, and 0.33 man for each equated track mile, with a beat of from 22 to 25 miles. On this branch some stationary gangs were, however, still retained in important yards, and in areas which, it was considered, were difficult to maintain with mobile gangs. These stationary gangs consisted of 1 mate, 1 keyman, and 1.25 men a track mile, and each maintained about 4 or 5 miles of track.

For the mobile gangs, three types of trolley were tried: an American Buda Type 4, a Parry, built in Germany and costing about Rs. 700 (£52 10s.), and a third machine supplied by Burn & Co. Ltd., Calcutta. Of these the Parry was found to be the most suitable.

Special instructions were approved by the Senior Government Inspector for the working of these trollies, which are run without "line-clear" and without blocking the line. The trains run mainly at night, but any in daylight have caution orders issued to their drivers warning them to look out for trollies.

As it was found that the 22-25-mile lengths were unmanageably long, they were reduced, first to from 15 to 18 miles, and ultimately, in July, 1937, to about 12 miles; the gang strength was also raised to 0.50 man a track mile.

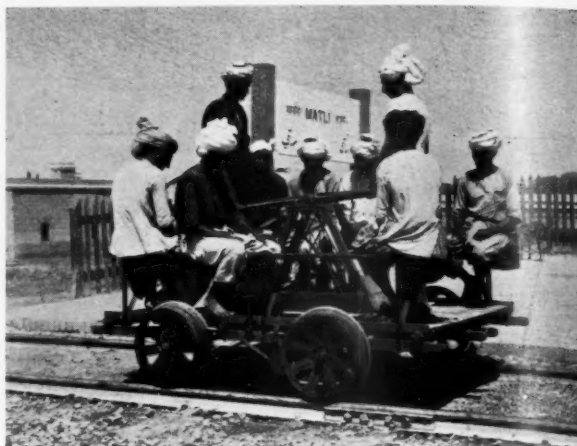
As at present organised these mobile gangs effect a saving of about Rs. 33,000 or say £2,500 on the maintenance of 209 miles of track. Actually there are 13 mobile gangs maintaining 159 track miles, and 12 stationary gangs maintaining 65 miles.

On the recommendation of the Wedgwood Committee it was decided in 1937 to introduce, as an experimental measure, the mobile gang system of track maintenance on other sections of the North Western Railway. The following sections were selected:—

Division	Section	Length (miles)	No. of mobile gangs
Delhi	Kurkshetra—Narwana	54	4
Ferozepur	Bahawalnagar—Kut-al-Imara	150	13
Karachi	Hyderabad—Badin	63	5
	Khanpur—Chachran	21	2
Lahore	Phagwara—Nawashahr	50	4
	Doaba		
Multan	Rahon—Jaijon Doaba	74	6
	Shorkot Road—Qila		
Rawalpindi	Sheikhupura in part..	46	4
	Mandra—Bhaun		

The strength of the gang on each of these sections is to be 1 mate, 2 keymen and 0.66 man an equated track mile with a beat of about 12 miles.

One of the first of the above sections to be converted to mobile gang maintenance, and one that is typical, is



*Buda manual trolley at Matli on the Hyderabad—Badin branch line, N.W.R.*

the Hyderabad—Badin branch in Sind, and the following are details of the organisation as now being introduced.

The Badin branch is a "C" class line laid with 75-lb. flat-bottom rails and timber sleepers, the number to each rail length being N plus 1 on the straight and N plus 4 on curves, where N is the number of yards in one rail length. There are six trains a day as far as Matli, 31 miles from Hyderabad, and four between Matli and Badin. The line is single throughout the 61 miles to Badin and there are seven crossing stations, including 33 points and crossings. The maximum permissible speed on the section is 25 m.p.h. In addition to the running line, there are three miles of quarry sidings.

At present, the permanent way is maintained by 14 gangs, there being altogether 14 mates, 14 keymen, and 88 gangmen. These are being reduced to five mobile gangs, or 5 mates, 10 keymen, and 40 gangmen.

The monthly scales of pay, which are the same for ordinary and mobile gangs, are:—

Mates	Rs. 22-2-30 (33s., rising by annual increments of 3s. to 45s.)
Keymen	Rs. 15-1-20 (22s. 6d., rising by annual increments of 1s. 6d. to 30s.)
Gangmen	Rs. 14-1-19 (21s., rising by annual increments of 1s. 6d. to 28s. 6d.)

So the saving in wages through introducing the mobile gang system is expected to be well over Rs. 1,000 (£75) a month.

Six Buda manual trollies have been purchased from Illinois, U.S.A., five of which will be placed in service and one held in reserve.

The results of the use of mobile permanent-way gangs on this railway will be awaited with keen interest. The South Indian Railway is also understood to be trying this method for the maintenance of branch lines served by a comparatively meagre train service, and as such branches abound all over India, the aggregate savings possible from this system of maintenance is very considerable.



# RAILWAY NEWS SECTION

## PERSONAL

### L.M.S.R. APPOINTMENTS

The following appointments have been approved by the directors:—

Mr. J. Keyden, Assistant to Divisional Superintendent of Motive Power, Glasgow, to be Assistant to Operating Manager (Motive Power), Glasgow.

Mr. T. W. Brown, Assistant-in-Charge, Materials Inspection Bureau, Chief Mechanical Engineer's and Electrical Engineer's Department, Crewe, to be Chief of Central Materials Inspection Bureaux, Chief Mechanical Engineer's and Electrical Engineer's Department, Derby.

Mr. F. S. Cotton, Assistant-in-Charge, Materials Inspection Bureau, Chief Mechanical Engineer's and Electrical Engineer's Department, Horwich, to be Deputy Chief of Central Materials Inspection Bureaux, Chief Mechanical Engineer's and Electrical Engineer's Department, Derby.

Mr. C. J. Poulter, Chief Transit Clerk, District Goods Manager's Office, Broad Street, to be Goods Agent, Poplar.

Mr. G. B. Parker, Chief Cartage Clerk, District Goods Manager's Office, Broad Street, to be Goods Agent, Victoria Docks and Canning Town.

Mr. W. H. Letts, Head Office Inspector (Station Analysis Section), Chief Operating Manager's Office, Euston, to be Goods Agent, Commercial Road.

Mr. T. W. Johnson, Chief Transit and Station Working Clerk, District Goods and Passenger Manager's Office, Stoke, to be Goods Agent, Stoke.

Mr. J. Donaldson, Stationmaster, Stirling, to be Stationmaster, Inverness.

Mr. J. Collins, Stationmaster and Goods Agent, Lockerbie, also in charge of Castlemilk, to be Stationmaster, Stirling.

Mr. F. J. McCormack, Stationmaster, Greenock Central, to be Stationmaster and Goods Agent, Renfrew.

Mr. W. W. Abbott, Chief Parcel Clerk, Nottingham, to be Passenger Agent, Coventry.

Mr. F. Townsend, District Foreman, Carriage and Wagon Department, Llandudno Junction, to be District Foreman, Lime Street and Edge Hill, Liverpool.

Mr. G. H. Flint, Chief Permanent Way Inspector, Chief Engineer's Department, Barrow, to be Chief Permanent Way Inspector, Chief Engineer's Department, Nottingham.

Mr. R. E. Scott, Permanent Way Inspector, Chief Engineer's Department, Sandiacre, to be Chief Permanent Way Inspector, Chief Engineer's Department, Barrow.

Mr. H. J. Peacock, whose appointment as Divisional Superintendent, Cardiff, Great Western Railway, as from January 1 next in succession to Mr. F. G. Wainwright, we recorded in our issue of December 2, joined the service of the G.W.R. in 1898 in the Divisional Locomotive and Carriage Superintendent's Office at Bristol. After working for a few months there, he was transferred to the Traffic Department at Stapleton Road, Bristol,



Mr. H. J. Peacock

Appointed Divisional Superintendent, Cardiff, G.W.R., from January 1 next

where he gained experience in passenger and parcels work. He joined the staff of the Bristol Divisional Superintendent in 1899, where he remained until his transfer to the Office of the Superintendent of the Line at Paddington in January, 1915. At Paddington, Mr. Peacock was associated with freight train operating and in 1923 he became chief of that section of the Superintendent of the Line's Department. In May, 1929, he returned to Bristol as Assistant Divisional Superintendent, and in July, 1933, was appointed Divisional Superintendent at Worcester. He actually took up the last-named appointment on September 19, 1933. Mr. Peacock was appointed Operating Assistant, Office of the Superintendent of the Line, Paddington, in 1937.

The L.M.S.R. has appointed Miss Islay Newlands, B.A., to be Divisional Lady Welfare Supervisor (Northern Division), Glasgow. Miss Newlands is a daughter of the late Mr. Alexander Newlands, Chief Civil Engineer of the L.M.S.R. from 1927 to 1933, whose death on August 28 this year was recorded in our issue of September 2. She has lately been employed as

Librarian Translator at the L.M.S.R. Research Department, Derby.

The Minister of Transport has appointed Mr. Edgar Macassey to be Chairman of the Traffic Commissioners for the West Midland Area in succession to Mr. Trevor Morgan, who has been appointed Chairman of the Western Area.

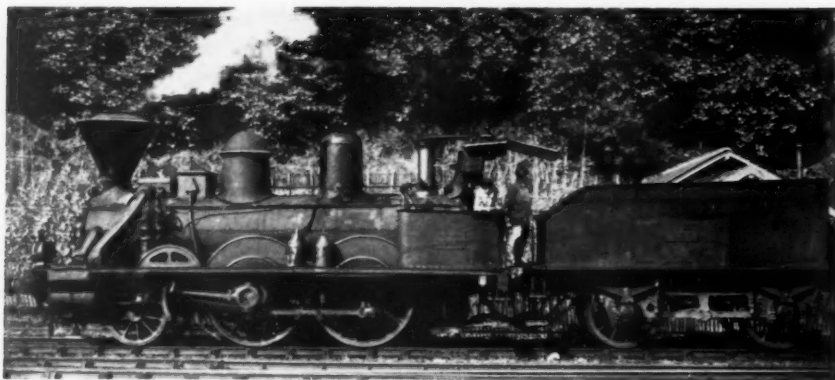
He has also appointed Mr. F. S. Eastwood to succeed Mr. J. Farndale, C.B.E., as Chairman of the Yorkshire Area on the latter's retirement on December 31 next.

Mr. R. Grant-Ferris, M.P. for St. Pancras N., and Mr. Charles L. des Forges, Town Clerk of Rotherham, have been appointed members of the Committee on Highway Law Consolidation to fill the vacancies occasioned by the death of Mr. Frank Clarke, M.P., and the resignation of Mr. F. Warbreck Howell on relinquishing the post of Town Clerk of Manchester. The committee, of which Lord Amulree is Chairman, was appointed by the Minister of Transport and the Minister of Health at the beginning of this year with the following terms of reference: "To examine the existing law relating to highways, streets, and bridges in England and Wales and to prepare one or more Bills codifying the law with such amendments as may be desirable to secure simplicity, uniformity, and conciseness."

### PRESENTATION TO SIR DAVID J. OWEN

The Chairman and members of the Port of London Authority have presented Sir David J. Owen with a silver salver on his retirement from the post of General Manager to the authority from 1922 to 1938 (see our issue of September 23). The signature of each Member of the authority is inscribed on the salver, together with Sir David's coat of arms. The authority has also passed the following resolution: "That the authority place on record their appreciation of the conspicuous services rendered by Sir David J. Owen as General Manager since March, 1922, and that an expression of their best wishes be conveyed to him on his retirement."

Mr. H. F. Molony, B.A., M.A.I. (Engr.) M.Inst.C.E., formerly Bridge Engineer on the Chief Engineer's staff of the Entre Rios and Argentine North Eastern Railways, has resigned from his railway duties on being appointed an Engineering Inspector at the Ministry of Health. Mr. Molony studied Arts and Engineering at Trinity College, Dublin, taking his B.A. in 1921 and the engineering



*Left : Old 2-4-0 locomotive used on the Landes branch lines of the Midi section of the French National Railways. It is referred to in a letter from a correspondent we publish on page 988*

*Right : An example of a Bollman truss bridge, of which a few specimens remain in use in the United States. Its design was the result of early experiments by Wendell Bollman in the Baltimore & Ohio Railroad tin-smith's shop at Mt. Clare, with models made of wire and other materials, which were tested to destruction. The part that failed first was strengthened after each test until the design illustrated above was finally evolved. The particular example carries the B. & O. Shenandoah Division main line over the Opequon River. A Bollman truss bridge spanned the Potomac River, as illustrated on page 490 in our issue of September 16, but the bridge was washed away in the floods of March, 1936*



*The "square deal" streamers at Paddington station, G.W.R. The left-hand view shows the main approach road, and the right-hand picture a corner of the circulating area*

degree in the following year. In 1927 he became a Master of Engineering. On completion of his university studies, he became a pupil to the late Sir Basil Mott, Bt., C.B., M.Inst.C.E., the well-known Westminster consulting engineer. On completion of his pupillage he remained with Sir Basil's firm and was engaged until 1927 on various bridge and underground railway works in England. Prior to joining the staff of the Entre Rios and Argentine North Eastern Railways in 1928, he was with the Metropolitan District Railway. Mr. Molony has recently been engaged on the construction of the north-eastern extension of the Central Line, London Transport.

#### INDIAN RAILWAY STAFF CHANGES

Mr. G. J. Eades, Deputy Chief Engineer, Signals, N.W.R., has been granted 28 months' leave preparatory to retirement, as from November 13.

Mr. S. Simpson, Chief Electrical Engineer, N.W.R., on return from leave, resumed his duties.

Mr. H. J. Allinson, Officiating Chief Electrical Engineer, N.W.R., on relief by Mr. Simpson, has been transferred to the E.B.R. in the corresponding appointment there.

Khan Bahadar M. D. Sheik, Officiating Deputy General Manager, Personnel, N.W.R., has been granted four months' leave as from October 7.

Mr. T. N. Kunzru, Officiating Deputy Chief Engineer, N.W.R., has been granted two months' leave as from October 21.

Mr. E. R. Casement has been appointed Senior Government Inspector of Railways, Circle No. 2, Calcutta.

Mr. N. W. Synott has been confirmed as Deputy Chief Commercial Manager, E.I.R.

Mr. H. J. Mulleneux has been confirmed as Chief Electrical Engineer, G.I.P.R., with effect from October 5.

Mr. C. F. White has been permanently promoted to be Deputy Chief Mechanical Engineer, G.I.P.R., as from November 5.

Mr. F. F. Parish, Deputy Chief Accounts Officer, G.I.P.R., has been granted eight months' leave as from October 25.

Mr. E. Cole, Controller, Peterborough, L.M.S.R., retired on October 31 after 47 years' service with the former Midland Railway and the L.M.S.R. He was presented with a case of pipes by Mr. R. Bennett, District Controller, Peterborough, on behalf of the office and control staffs.

Mr. W. Gilmour Smith, of W. Gilmour Smith & Co. Ltd., makers of Railite belting for train lighting and Gisanco carriage roofing, has been ordered a voyage to South Africa in search of a restoration of normal health. He will be away until the middle of January next year.

Mr. G. B. F. Neele, General Manager of the Leopoldina Railway, arrived in this country on leave on December 5.

At a meeting of the General Managers' Conference at the Railway Clearing House on December 6, Sir James Milne was appointed Chairman of the conference for the year 1939.

M. Avramoff has been appointed Minister of Railways in the new Bulgarian Cabinet.

From *The London Gazette* of November 29: Regular Army Reserve of Officers, Corps of Royal Engineers: Lt.-Colonel D. R. Bennett, O.B.E., A.M.Inst.C.E., having attained the age limit of liability to recall, ceases to belong to the Reserve of Officers.

Lt.-Colonel Bennett is Engineering Assistant for Electrification to the Chief Engineer, Southern Railway.

#### L.N.E.R. APPOINTMENTS

The L.N.E.R. announces that the following appointments have been made:—

Mr. M. A. Cameron, District Passenger Manager, Leeds, to be Assistant to the Passenger Manager, Southern Area, in succession to Mr. J. W. Oddy, who will be retiring from the service at the end of January next year.

Mr. K. B. Turner, Engineer's Office, King's Cross, to be Assistant District Engineer, King's Cross, in succession to Mr. H. T. Bird, who has recently been appointed District Engineer, Boston.

We regret to record the death on December 2, after a brief illness, of Sir Thomas Octavius Callender, Managing Director of Callenders Cable & Construction Co. Ltd., and well known as a pioneer of electrical transmission. "Tom Callender," as he was always known, was born in Glasgow in 1855, and his first business experience was in his father's firm of Callender & Sons, which had introduced asphalt and bitumen into Great Britain for road-making. After a visit to Petersburg in 1880, when he saw electric lighting in use at the opera house, he concentrated upon electric supply work. A year later his father was granted a patent for "improvements in the manufacture of telegraph conductors and materials for covering and insulating wire or other conductors used for telegraph electric or similar purposes." In consequence Callender's Bitumen Telegraph & Waterproof Co. Ltd. was formed, with Mr. Thomas Callender as Manager. Fourteen years later business had expanded to an extent that made a reorganisation necessary, and on July 24, 1896, Callenders Cable & Construction Co. Ltd. was registered, with a capital of £100,000. Mr. Thomas Callender was Managing Director, the position he held until the end of his life. He was knighted in 1918 for public work and services to the nation.

## The Hay Railway 1810-1864

At the monthly meeting of the Railway Club held on Thursday of last week (December 1), Captain Francis B. Ellison of Eardisley, Herefordshire, read a paper on the history of the Hay Railway from 1810-1864, a subject to which he has devoted very considerable study. He began his remarks by outlining the difficulties experienced in the transport of coal to Herefordshire at the beginning of the nineteenth century, and said that North Herefordshire on December 24, 1800, heard with mingled feelings that Brecon had received on that day cheap coal brought by the new canal. From that time the district earnestly sought the provision of improved transport but without success, however, until William Crossley produced in 1810 a plan and survey for a horse-operated tramroad from Brecon to Hay and Parton Cross (Eardisley). His scheme was never adopted in detail and he was paid only £180 for all his work; his services were dispensed with on September 7, 1811. The promoters, who were wealthy local landowners, proceeded with the idea and eventually secured the incorporation of the Hay Railway by Act of May 25, 1811.

Captain Ellison's paper then outlined with a wealth of detail the results of his research into local records regarding such particulars as advertising for tenders. John Hodgkinson was appointed engineer, and on his recommendation an amending Act was secured on May 20, 1812, authorising an improved route *via* Llangorse and Talgarth and through a tunnel at Tal-y-lyn. The section of the line from Brecon to Hay was opened on May 7, 1816, and the portion thence to Eardisley on December 11, 1818, when the proprietors gave four tons of coal to the poor at Eardisley. Captain Ellison added that this line, which was about 25½ miles long, although designed principally for the transport of coal, later carried passengers also. He referred at length to the permanent way (L-shaped tramplates spiked to stone sleeper blocks laid to a gauge between centres of the blocks of about 3 ft. 6 in.) and to the various traders whose vehicles worked over the line. Another undertaking, known as the Kington Railway, extended the line a few years later to Burlinjob lime works, Old Radnor. The latter eventually was taken over by the Kington & Eardisley Railway, formed on June 30, 1862, and now part of the G.W.R. The Hay Railway itself was purchased in 1863 by the Hereford, Hay & Brecon Railway which used the old route where it could, and disposed of the remainder of the property. Although there are still some points which have eluded Captain Ellison, his researches have resulted in the collation of a valuable connected story of an early railway of which comparatively little is known. A particularly interesting feature of the lecture was the excellent series of slides.



## STAFF AND LABOUR MATTERS

### L.N.E.R. Superannuation Arrangements

Arrangements have now been completed by the London & North Eastern Company in regard to the consolidation of the constituent companies' superannuation funds, and a Bill has been introduced into Parliament by the company to obtain the necessary statutory powers. The following is a summary of the provisions of the scheme :—

#### Scope and Membership

The existing superannuation funds, so far as they apply to salaried staff, together with the L.N.E.R. provisional scheme, will be merged into one fund. Provision will be made for the entry into membership of certain supervisory and clerical staff hitherto excluded, and, subject to certain conditions, membership will be compulsory for new entrants or those promoted to the salaried service of the company. There will thus be one salaried staff superannuation fund, from which all future superannuation payments, including pensions and supplements payable to the annuitants of the existing and provisional funds, will be made.

#### Rates of Contribution

The contribution scales will be as follows :—

Age on birthday nearest to date of entry	The new standard contribution scale (Applicable to entrants after December 31, 1935)	The new provisional scheme scale (Applicable to entrants between January 1, 1923, and December 31, 1935)
Less than 22	5	4
22	5	4
23	5	4
24	5	4
25	5	4
26	5	4
27	5	4
28	5	4
29	5	5
30	5	5
31	5	5
32	6	5
33	6	5
34	6	5
35	6	6
36	6	6
37	6	6
38	6	6
39	6	6
40	6	6

The above scale will be subject to certain minimum contributions after age 30

Admission after age 40 will be subject to such terms as to contributions and benefits as may be agreed by the committee with the advice of the actuary.

All future entrants to the salaried service and the fund will be required to pay the rate appropriate to their age at entry on the new scale. All members of existing funds will be required to pay an increased contribution. The contributions of those paying at the basic rate of their fund

will be increased to 4 per cent. of salary. Members at present paying more than the basic rate (*i.e.*, late-age entrants) will be required to pay an increase equal to the difference between that basic rate and 4 per cent. of salary.

Members of the L.N.E.R. provisional scheme who became contributors subsequent to December 31, 1935, will be required to pay contributions on the new standard scale and those who became contributors up to and including December 31, 1935, will pay on the new provisional scheme scale. Those who would have been eligible for membership had the new fund been in existence between January 1, 1923, and December 31, 1935, will be admitted at the rate appropriate to their age at entry as shown in the provisional scheme scale.

#### Benefits

The new standard superannuation benefit, payable on retirement after age 60, or after ten years' membership through ill-health, will consist of an annuity and a capital sum. The annuity to be equal to the aggregate of :—

- One one-hundred-and-twentieth of the average annual salary of which the member shall have been in receipt throughout the whole period during which he shall have been a member multiplied by the number of completed years not exceeding 40 during which he shall have been a member ; and
- One one-hundred-and-twentieth of the average annual salary of which the member shall have been in receipt during the period of seven years immediately prior to the date of his retirement from the service multiplied by the number of completed years not exceeding 40 during which he shall have been a member ;

Provided that if he shall have been a member for more than 40 years the calculation of his average salary for the whole period of contribution shall be based upon the average annual salary for the last 40 years of his membership of an existing fund or of the provisional scheme and of the fund.

The capital sum to be equal to 1/40 of the annual salary of which the member was in receipt at the date of his retirement multiplied by the number of completed years not exceeding 40 during which he shall have been a member. The above annuities will be subject to the following minima :—

Years of completed membership	Salary £200 or over	Salary under £200	Before age 60
On or after age 60			
26 or over	120	100	100
25	116	98	97
24	112	96	94
23	108	94	91
22	104	92	88
21	100	90	85
20	96	88	82
19	92	86	79
18	88	84	76
17	84	82	74
16	80	80	72
15	78	78	70
14	78	78	70
13	78	78	70
12	78	78	70
11	78	78	70
10	78	78	70

Provision will be made in the new fund for members to have the option of

converting the whole or part of their superannuation benefit into a joint annuity, payable during the joint lives of annuitant and wife, with payment of a widow's pension in the event of any such annuitant predeceasing his wife. Members of existing funds will have the option of declaring for :—

- Their existing benefits (including any supplemental annuity to which they may be entitled) ; or
- The new standard benefit.

Other benefits will be a life pension of £20 per annum to any member who retires in consequence of incapacity to perform his duties before the completion of ten years' membership ; refunds on leaving the service ; and death benefits.

#### Female Staff

With a few exceptions, the existing funds do not admit women to membership, but the rules of the new fund cover women who come within the definition of "salaried officers." This means in effect that women occupying clerical and supervisory posts will be admitted to membership on terms which, as far as practicable, place them on a similar footing to the male members. Provision is made for the cases of women who for a considerable time have been in the service of the company but have not hitherto been eligible for membership of a superannuation fund. It will thus be seen that the Bill is drawn on wide lines and seeks to legislate for the great majority of the company's existing salaried staff, both male and female, whether they are already members of a superannuation fund or not.

#### Finance and Guarantee

Into the new fund will be paid :—

- The accumulated amounts of :—
  - The existing funds.
  - The provisional scheme.
  - The superannuation reserves with the company.
- Future contributions of the members, with equal contributions from the company in respect of all sections.

The moneys of the fund not otherwise invested will be held by the company in irrevocable trust and interest credited at 4 per cent. per annum. The company will further pay into the fund such additional amounts spread over a period of years as will maintain the solvency of the fund, reserving the right if at any future valuation the standard contributions are insufficient to provide benefits to modify the arrangements, in consultation with the staff representatives, so far as concerns future entrants to the fund after such valuation.

#### Road Motor Drivers

Following the applications made to the Minister of Transport by the Institution of British Launderers Limited and the Associates Committee of the British Road Federation Limited, for variations during the Christmas trading period of the periods of time prescribed by Section 19 of the Road Traffic Act, 1930, as amended by Section 31 of the Road and Rail Traffic Act, 1933,

the Minister, after considering the advice of the Industrial Court has made the following Order:—

"In the case of heavy locomotives, light locomotives, motor tractors, and motor vehicles constructed to carry goods other than the effects of passengers and authorised to be used under 'C' licences, paragraph (ii) of subsection (1) of Section 19 of the Act shall be varied so as to provide that on not more than two days in each of the three weeks ending on December 17, 24, and 31, 1938, respectively, the limit of 12 hours may be substituted for the limit of 11 hours imposed by the said paragraph in respect of the aggregate of continuous periods of driving."

### Engineering Wages

At meetings held in London on Tuesday, December 6, the engineering employees rejected the claims of the engineering trade unions for improved wages and conditions for workpeople engaged in the engineering industry. The first meeting was between the employers, and the Amalgamated Engineering Union and the National Union

of Foundry Workers, who jointly claimed a substantial increase in wages and the restoration of pre-June, 1931, conditions of employment. Later in the day the employers met the Engineering Joint Trades Movement—comprising the Confederation of Shipbuilding and Engineering Unions and other trade unions—who claim (1) an increase in rates to timeworkers and an equivalent advance to men on systems of payment by results; (2) shorter working week; (3) restoration of the rates and conditions which operated prior to June, 1931, as affecting piece-work, overtime, nightshift and shift system; (4) holidays with pay.

Commander Sir Charles W. Craven, R.N., Chairman of the Engineering & Allied Employers National Federation, presided at the meetings, and the reply of the employers was given by Sir Alexander Ramsay, the Director of the federation. Sir Alexander Ramsay informed the trade unions that owing to the general state of the industry, the employers were not in a position to make any offer on any points of the claims. He explained that although there was increased productivity in

some branches engaged in rearmament, the industry generally was not in a position where further increase in labour costs could be contemplated. He quoted figures relating to output, profits, exports, holidays, rearmament, and costs, and produced a large number of graphs and statistical summaries. Sir Alexander, speaking, as he said, with a full sense of responsibility, told the unions that their application was not propitious and ought not to be pursued. He was of the opinion that the tide had turned and that it was time for "wise men to call a halt."

At the annual conference of the Amalgamated Engineering Union a few months ago it was decided to fix no time limit to negotiations, and to take a ballot vote for or against acceptance of the employers' offer. It is understood that the A.E.U. leaders consider that as no offer has been made there is no justification for a ballot, but a special conference of the national committee, the union's governing body, may be summoned. The Confederation of Shipbuilding and Engineering Unions will consult the executive committees of its affiliated bodies.

## The Work of a Main-Line Signalman

Mr. F. Honeybone, Divisional Superintendent's Office, Paddington, gave a lecture, illustrated by lantern slides, to the G.W.R. (London) Lecture & Debating Society on December 1 on the subject of the work of a main-line signalman. Mr. H. J. Peacock, Operating Assistant to the Superintendent of the Line presided. A signalman, said the lecturer, in an important box could not carry out his duties without long and intensive training and graduation from the least to the most important signal boxes. The majority of signalmen were recruited from the adult staff, who had the opportunity of learning about signalling in the classes which were held all over the system. Another source of recruitment was among the booking lads who were employed at some of the more important main-line signal boxes, to record bell signals and box-to-box messages. Before he was allowed to take charge of a box, the new signalman was given a period in which to learn the signal movements, and he had to pass an examination on the regulations. The signal boxes through which the signalman graduated were divided into seven classes; in the London Division, for example, the number of signalmen ranged from 29 in the Special class to five in the sixth class. The signal boxes were classified by the number of marks made by the signalman, which were allotted according to the number of operations he carried out.

The signalman would probably first be appointed to a Class 6 box, such as Lambourn. The boxes in this class and those in Class 5, such as Thame, were generally, so far as the London Division

was concerned, on a single line worked by electric token, staff or tablet. The signalman might subsequently proceed to boxes in Classes 4 and 3 such as Drayton Green and Oxford Road. These boxes were generally on quieter double line sections, but especially during the summer they had important work to do, since the signalman had to keep the line clear for express trains which sometimes involved the shunting of the less important. These signalmen also had to control level crossing gates and might have to regulate working during occupation of the line by the engineering department.

The signalman graduated to the three highest classes, Special, and Classes 1 and 2, under the Sectional Council promotion scheme and he had to keep his knowledge up to date for the periodical examinations and the examinations at each step of promotion. Before the signalman reached the special class box such as Old Oak Common East at which the working was very intensive, he had usually graduated through the classes.

The lecturer described in detail the apparatus which the signalman has to learn and which in a large measure assisted him and prevented a mistake being made; he quoted interlocking of signals, and of signals with bell instruments, reminder flaps, detonator placer machines, and perhaps the best safeguard of all, track-circuiting, which on crowded lines also permitted much greater freedom of operation. The importance of these arrangements would be realised when it was remembered that the signalman had to remember at

least 47 bell codes, and also an additional number up to 20 at the larger stations. In the track-circuited sections the train movements were also shown to the signalman on an illuminated panel in the box.

The signalman's duties could be summarised as safeguarding the passage of trains through the section of line, and he sometimes had to be able to deal with emergencies which required quick and cool thought and action. His training and experience enabled him to do this effectively. Such an emergency as the blocking of one line might necessitate working trains on the wrong line, and the clearest understanding in operating. Even in ordinary time the working of very busy sections, such as that between Old Oak Common and Paddington, needed great care by the signalman so as to avoid the possibility of dislocation at Paddington station.

There were in addition to the seven classes of signalmen afore-mentioned, the three grades of district relief signalmen who had to be able to work many boxes at different times. These men were selected from the signalmen, and from them in turn were selected the inspectors.

**TURKISH MAIN-LINE RAILWAY.**—The Divrik-Ersingian line, 90 miles long, and the penultimate section of the Ankara-Erzurum main line, has been opened to regular traffic. It is now expected that the remaining Ersingian-Erzurum section will be opened in October, 1939, after which the modernising and rebuilding of the 5-ft. gauge line between Erzurum and the Soviet frontier will be considered; most of the traffic over this route now goes by road.

## The Commercial Organisation of the French Railways

A survey of current practice on the S.N.C.F.,  
prepared for the Railway Students' Association

The second ordinary meeting of the Railway Students' Association (London School of Economics and Political Science) was held on December 5, when a paper entitled "The Commercial Organisation of the French Railways" was read by M. Charles R. Cazenave, District Commercial Superintendent, S.N.C.F., London, and Assistant to the Managing Director, French Railways—National Tourist Office.

M. Cazenave divided his survey under four headings: the salient periods in the history of French railways, the formation of the National Railways Company, passenger and goods rates and conditions, and co-ordination.

### Three Periods of History

The history of the French railways, prior to 1938, he said, fell into three main periods: 1842-57, 1857-83, and after 1883. The first was the period during which 5,000 miles of main lines were constructed, and when there was close co-operation between rail and road transport (the roads acting as feeders to the railway). The lines (that is buildings and permanent way, except actual rails and sleepers) were constructed by the State. The railway companies were granted a 99 year concession, and had to provide the track, appliances, locomotives, and rolling stock. At the end of the concession, these were to be purchased by the State, at an expert valuation. During the second period the construction of the main lines was completed, and that of the subsidiary lines to connect the principal provincial towns undertaken. The length of lines was increased from 5,000 to 16,500 miles, and this brought about a drastic diminution of road traffic. The period after 1883 opened with the realisation of an ambitious programme, which, under pressure of political opinion, provided for the extension, to the whole of the country, of the advantages bestowed by the railways. As many of the lines proposed were never likely to be called upon to carry sufficient traffic to justify the expense involved in their construction, the Government and the railways signed, in 1883, a series of conventions, based on three principles: (a) concession to the different companies of the upkeep, development, and working of the railway systems, (b) interest on loans guaranteed by the State, (c) profits shared between the State and the railways. As the railways then enjoyed an undisputed monopoly, the State imposed many onerous bye-laws and regulations. From 1883 to 1914, the length of lines increased from 16,500 to 25,000 miles (compared with the 19,000 con-

trolled by the British main-line railways). Incidentally, the proportion of route miles to the number of inhabitants became greater in France than in any other European country, there being one route mile to every 1,585 inhabitants, compared with 2,368 in Great Britain.

After the heavy demands made upon them during the great war, the French railways strove to modernise their organisation, equipment, and rolling stock. From 1930 onwards, they experienced the discouraging effect of a series of deficits, one element of which, the receipts, was almost entirely beyond their control, owing to their limited freedom of action, while another, expenditure, became more and more burdensome every year as a result of economic difficulties and road competition. The railways being thus faced with an ever-increasing deficit, a new convention was signed on August 31, 1937, completely changing their structure. A national company was to be formed, to take over the railway systems from the individual private companies. The Government was to have a majority shareholding (51 per cent. of the shares) in this new company of which it had the power to nominate, or to approve the appointment of the chief executive officers. The remainder of the shares were to be allotted to the individual companies, who, in exchange, abandoned in fact, if not in intention, their concessions, their rights to the track stores, locomotives, and rolling stock. They were no longer responsible for the upkeep, development, and working of the lines, but continued to have separate existences as holding companies, and for the purpose of conserving until 1955 (the average date when their original concessions were due to expire) the resources represented by the private property which they had acquired, as distinct from that for which they only held concessions. In 1955 these holding companies would distribute their shares among their shareholders, and such shares would all be redeemed by 1983. According to the convention of August, 1937, the new company, the *Société Nationale des Chemins de fer Français*, took over the railway systems on January 1, 1938, for a period of 45 years. In 1983, all its assets must be handed over to the State without payment.

### Administrative Structure

M. Cazenave then briefly outlined the administrative structure of the S.N.C.F. First of all, he said, there is a General Meeting of shareholders (State and private companies) holding certain prerogatives and a general power of surveillance and control; an Audit Board

which makes whatever investigations and criticisms it deems necessary; and a Board of Directors with very wide powers, assisted by a Managing Committee, to which it delegates a part of its authority.

Secondly the chief executive officers and departments comprise:—

The General Manager, responsible for the balancing of the railway budget and controlling the central and regional headquarters.

Central Headquarters, which comprise eight departments:

1. Buildings and equipment.
2. Locomotive and rolling stock.
3. Operating—for the composition and running of trains.
4. Commercial—divided into passenger traffic, goods traffic, publicity, co-ordination of rail and other competitive ways.
5. Staff.
6. Finance (shares, accountancy, and audit).
7. Stores.
8. Research—dealing with all these departments for statistics, information, and study of new schemes.

Regional Headquarters (North, East, South East, South West, and West: five in all) which correspond practically to the old individual railway systems. Each Region is in the charge of a Regional General Manager, each with his headquarters in Paris (the terminal station for all of them). He is responsible to the General Manager and controls all departments in his Region. Each Regional Headquarters comprises three principal departments: (a) Permanent way and buildings; (b) Locomotives and rolling stock; and (c) Traffic (commercial and operating).

Although the Central Headquarters departments secure uniformity in method and practice in the different regions, it is the Regional Headquarters Departments which are of particular interest, as it is there that the actual working of the French railway system takes place. For example, the Commercial Department of the South Western Region is a good illustration, both in its conception and working, of the new organisation of the French National Railways. This department was organised by Monsieur Berthelot as a result of the visit he made to Great Britain to study in detail the methods used by the L.M.S.R. He decided to adopt the following organisation: a powerful commercial department which could give instructions to the operating department; a sales organisation to sell transport to the public, and to develop goods and passenger traffics, thanks to the constant improvement of the services offered; regulation of rates, not by wholesale alterations, but by adjustments to apply to individual traffics, provided these adjustments could be made quickly; development of door to door traffic; co-ordination and regulation of traffic by rail and road.

This regional commercial organisation comprises:

In Paris: a department for the analysis and co-ordination of reports received from the provinces, from which information is abstracted justifying the introduction of new rates, timetables,



and technical improvements. This department is divided into seven sections:

(1) To obtain passenger traffic, and to study and supervise present conditions with a view to future improvements.

(2) To obtain goods traffic.

(3) Commercial publicity and propaganda, destined to inform the public regarding rail transport, and on those products the traffic in which could be increased. In addition, this section is concerned with the education of producers and traders (instructional tours, free distribution of selected plant stocks, &c.). The above three sections form the Sales Department.

(4) Investigations into the possibilities of co-ordination with other means of transport and developing door to door traffic.

(5) Agreements and contracts with official departments and administrations, and with the other Regions (e.g., Railway Clearing House).

(6) Passenger and goods rates.

(7) Claims.

*In the Region:* District Commercial Superintendents, and canvassers. The District Commercial Superintendents must furnish reports every month dealing in particular with the following subjects: a general survey of the traffic and receipts compared with the corresponding month of the previous year, giving the principal causes of

any fluctuations which may have occurred; passenger traffics; the various goods traffics; results obtained by the canvassers and propaganda which has been done during the month; and the agricultural, industrial and commercial prospects of their particular districts.

Periodical conferences are held in Paris so as to enable the Traffic Manager to maintain personal contact with the District Commercial Superintendents and give them instructions.

In order to complete the record system, the Commercial Manager and the District Commercial Superintendents possess card indexes for passenger and goods traffics, and collections of statistics. In the case of passengers, cards are kept for recording the results of certain kinds of traffic (various cheap fare tickets), certain periodical events (fairs, exhibitions, religious festivals, sporting events), certain special trains or periodical excursions (winter sports trains, holiday trains) and traffic procured by travel agents, or other organisations having regular business relations with the railways. In the case of goods, cards are kept giving

the name and address of the client, the names of the chief executive officers, business activities, the kind of transport involved (private siding, containers, private wagons, lorries, boats, &c.), the annual tonnage for the principal transits of goods received or despatched by the different means of transport (rail, road, water), the corresponding carriage rates, and also a *résumé* of current negotiations or business between the railway and the client. There are cards for all clients whose traffic by rail reaches a total of at least 500 tons per annum, or whose traffic, even of less importance, is of particular interest.

After a detailed explanation of the various passenger and goods tariffs and rates, M. Cazenave concluded by outlining the steps taken to co-ordinate road and rail traffic in 1934 and 1937.

A hearty vote of thanks to M. Cazenave for his excellent paper and to Mr. C. E. R. Sherrington for his services in securing the speaker was proposed by Mr. L. W. Orchard, chairman of the R.S.A. Committee, seconded by Mr. H. Bailey, and carried with acclamation.

## The Dublin & Drogheda Railway

Mr. Kevin A. Murray, who has already presented to the Old Dublin Society interesting papers relating to the history of the Dublin & Kingstown, and the Kingstown & Dalkey Railways, added to his series recently by giving that society a paper on the history of the Dublin & Drogheda Railway. He traces its origin to the interest in railways which resulted from the early success of the Dublin & Kingstown Railway, opened on December 17, 1834.

Then one Thomas Brodigan of Drogheda published a letter in April, 1835, recommending the construction of a railway link between Dublin and Drogheda. A committee was quickly formed and William Cubitt was appointed engineer. On October 11 of the same year, a meeting held in Dublin heard his report and recommendation in favour of a route along the coast, but strong opposition to this plan arose from the advocates of a route *via* Navan, which became known as the inland route. As it proved impossible to reconcile conflicting interests, a competitive Dublin, Navan & Armagh Inland Railway was promoted. In his paper Mr. Murray gave very full details of the intense rivalry between the two parties before the Dublin & Drogheda (coastal) scheme eventually received the Royal Assent on August 13, 1836. The financial depression and other matters resulted in further delay and it was not until October 12, 1840, that construction was begun.

### The Gauge Problem

So far no decision had been made regarding the gauge of the track. Vigorously, the Chief Engineer of the Dublin

& Kingstown Railway, had advised 6 ft., but the directors of that company had eventually adopted the English standard of 4 ft. 8½ in. The Irish Railway Commission of 1836-38 recommended a gauge of not less than 6 ft. 2 in. for Ireland, and the Ulster Railway, from Belfast to Portadown, was laid and worked to that gauge. The Dublin & Drogheda directors appear to have begun with the intention of adopting the same gauge, for the cuttings and so forth were made wide enough for it. In 1842, however, they were still sufficiently undecided to invite their engineer, John MacNeill, to submit a report on the matter, and he selected 5 ft. 2 in. This naturally caused consternation to the board of the Ulster Railway, as it was intended eventually for the two undertakings to form part of the through link between Dublin and Belfast. The Ulster Railway eventually called upon the Board of Trade to compel the Dublin & Drogheda Railway to use 6 ft. 2 in., but that body (and the Irish Board of Works, to whom the matter was submitted for decision) declined to attempt anything beyond their legal powers. The Board of Trade commissioned its Inspector-General of Railways, Major-General Pasley, to examine the matter, and his inquiry satisfied him that 5 ft. was the narrowest and 5 ft. 6 in. the widest gauge advisable in all the circumstances; by the elementary mathematical process of splitting the difference he arrived at 5 ft. 3 in. Subsequently the last-named figure was established by Law as the Irish standard, and when the Ulster Railway was relaid to the new gauge a large part of the expense was recouped to that com-

pany by the Dublin & Drogheda and three other railways that were affected.

### Opening Ceremony

The opening ceremony was fixed for May 24, 1844, on which day the Lord Lieutenant had agreed to open the railway and to lay the foundation stone of the terminal building in Dublin at Amiens-Street. The ceremony proved to be a magnificent spectacle, and was crowned by the conferring of a knighthood upon the Engineer, who now became Sir John MacNeill. A temporary station at Drogheda served until the Boyne was bridged, and the other original stations were simple structures with wooden platforms and buildings; as traffic increased stone and brick replaced timber. Mr. Murray's paper then described in some detail the engineering features of the line and the early traffic arrangements. In the latter connection it is notable that seven persons, including the editors of the *Freeman's Journal*, *Saunders Newsletter*, and the *Irish Railway Gazette*, were supplied with perpetual free tickets. As early as February, 1849, the company introduced the novelty of return tickets, even for the third class, at one-and-a-half times the single fare. In 1849, also, the company was selling Sunday tickets for all three classes which permitted the holder to travel all day when and where he would—the germ of the "zone" ticket idea.

The Howth branch was sanctioned in 1845 and opened for 2½ miles on July 30, 1846; the remainder to the harbour was brought into use on May 30, 1847. The directors encouraged local efforts to re-establish Howth as the mail-packet station, but these were unsuccessful, and the supremacy of Kingstown (now Dun Laoghaire) has been maintained ever since.

## MINISTRY OF TRANSPORT ACCIDENT REPORT

### Newport (Mon), G.W.R.: August 19, 1938

At about 12.10 a.m. the 11.54 p.m. train, Newport to Bristol, consisting of seven bogie vehicles and two four-wheel fish vans, vacuum brake on all of them, drawn by 4-6-0 engine No. 4925, started from the down platform and, being diverted along a short spur line, collided with a stop block at about 5 m.p.h. Three passengers suffered minor injuries. It was a fine clear night, with dry rail. The accident was due to the clearing of a wrong signal and a fireman misreading it. The accompanying diagram shows the circumstances of the case, which

lamps and the brake was tested. The driver, next to the platform, could not see signals Nos. 72 and 73 from his side. Lansdown saw the advanced starting signal, No. 91, change to green, and then No. 73 disc; he called out "Right the dummy" to James, who called out "All right here" to Foreman Davey. The signal to start being given, James saw Nos. 69 and 91 at green and started. Goddard and Davey could not see Nos. 72 and 73 from where they were standing. After a very short distance Lansdown saw the stop block light, realised they

placing a collar on No. 73 lever was effective; it was not in accordance with the normal method of using one on the relevant signals in rear, but he cannot be blamed to any serious degree for that. He suggested he was thinking the pilot engine might leave the Fish sidings without authority, but admitted he had no real grounds for it, while his action would not have given any real protection against such a move. Colonel Trench thinks this argument was probably an afterthought; Griffiths' real motive was to protect against a down train. Others did normally approach, but none was doing so on the night in question. Conflicting movements, however, could have been made only under a disc or calling on signal, as track circuit lock-

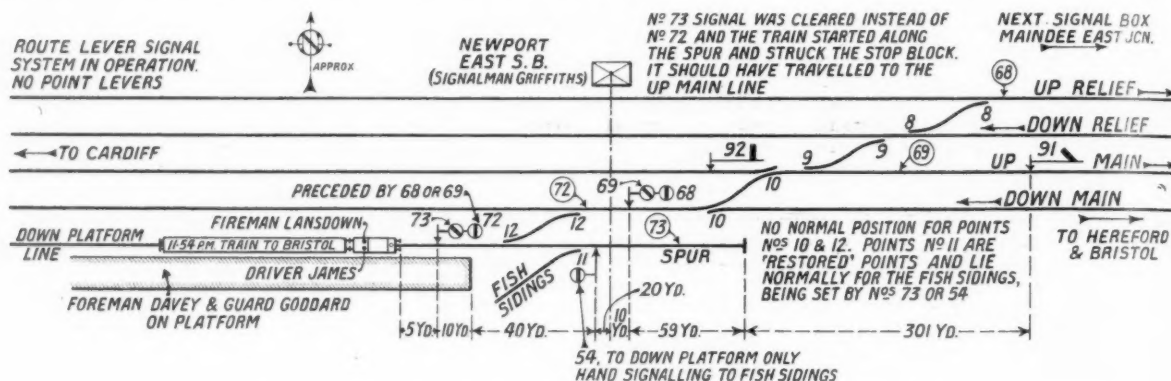


Diagram illustrating accident at Newport, G.W.R., on August 19, 1938

was inquired into by Colonel A. C. Trench.

The signalling is on the Insell-Ferreira electric route-lever system, in which the manipulation of a single lever sets the points and then, when required, clears the signal for a given movement. No point levers are used (emergency point working is dealt with by other means). Some points have no normal position, but others are restored to one when a movement is finished. Practically the whole layout is track-circuited, with illuminated diagrams. The East signal box was alone concerned in this case.

The train had arrived from the Hereford direction, reaching the platform over crossovers Nos. 9, 10, and 12. The engine was waiting in the spur to take the part concerned to Bristol via the up main line, together with a pilot engine, which was to deal with a fish van to be detached.

Driver James, of engine No. 4925, had been in this link for about four years and worked the train four nights in 12 weeks, and another one through Newport three times in the same period, most of his work being on the other side of the Severn tunnel. His fireman, Lansdown, had been with him for 14 to 15 months, save for about five months' illness. The engine was backed on in due course and coupled by a shunter. Lansdown changed the

were on the spur, and shouted. James made a full brake application and closed the regulator.

Signalman Griffiths, East box, said that after replacing No. 54 to danger behind the engine, and thus restoring points No. 11 to normal, he pulled No. 73 lever to the route-setting position and lever-collared it, the signal, of course, remaining "on," in order to protect the waiting train. He used the collar to remind him not to pull to the signal-clearing position. He had to await "out of section" for a goods from Maindee East junction and pulled No. 69 to the route-setting position, afterwards removing the collar from No. 73. When he got the Bristol train accepted, he pulled No. 69 right over, then Nos. 73 and 91; he had forgotten about the collar, removed a moment before in readiness to replace No. 73 and pull No. 72. He was anxious to answer the telephone.

#### Inspecting Officer's Conclusions

The accident was due, as all three men frankly admitted, to Griffiths pulling the wrong lever, Lansdown not realising that the wrong signal was given, and James accepting Lansdown's intimation that their signal had been pulled off. Griffiths cannot be criticised for his very proper desire to protect the train against inadvertent release of other movements, and his

ing was holding any running signals concerned. Griffiths' failure was due to not acting on the reminder given when removing the collar and replacing No. 73 to normal; his attention being occupied with block signals, he committed the very mistake he had taken precautions to avoid. The major share of responsibility lies with him. He has 44 years' service, 40 as signalman, and a clear record.

Lansdown, 19 years' service with 14 as a fireman and a clear record, saw a disc come off which applied to his train, and it did not occur to him that the signalman had pulled off the wrong signal and set a wrong road. He said he was familiar with all running signals at Newport, but would not claim that he knew all the shunt signals. It was suggested that the two discs Nos. 72 and 73 might cover three directions, to the spur, the up main, and the up relief and he may have assumed that the movement into the spur was unsignalled; the lower disc, No. 73, would then have led to the up main; there is, however, another pair of discs ahead, Nos. 68 and 69, which precede No. 72 and separate the up main and up relief routes, and it should be remembered that he had seen No. 73 pulled off for the spur when the engine had gone to wait for the train.

Driver James could easily have moved across the footplate to verify

the aspect of the disc signal; but he had a fireman whom he considered reliable and it was quite clear to him that a signal had just been pulled off. He had to inform the platform staff on his own side and get a signal from them and, before moving off, he saw the two signals next ahead off. Moreover, being 16 min. late, he would be anxious to avoid delay; he could hardly hope to make up much time to Bristol, where he had a connection to make. But whatever may be the reasonable exercise of a driver's discretion in taking the word of a reliable fireman, ultimate responsibility for correct observance of signals must remain with him, and James must bear his share of responsibility. The total distance run was only 140 yds. and, starting away slowly, he might not notice that he was not going through the crossover, but it is surprising he did not notice the undue proximity of a low wall on his right, immediately over which was

a brilliantly lit area of roadway and castle walls. He stated that immediately after looking back along his train on starting, he entered up the time in his book, and suggested that his failure to notice the wrong road might have been due to this. He has 34 years' service, except for four years' war service, has been a driver for 19 years, and has a clear record. He and Lansdown were to some extent victims of unfortunate circumstances.

#### Recommendations and Remarks

This wrong road running movement takes place once daily for this particular train only, and at weekends, or about 400 times per annum. Although the existing disc signal is immediately adjacent to the starting point, it would be preferable that the movement, if likely to continue in regular daily use, should be controlled by a running signal and the company should consider the

desirability of providing one. To change these disc signals to the platform side would render them visible from the driver's side in this particular case, but owing to curvature and platform buildings, less visible to shunt movements as they approached and, of course, to a driver located on the opposite side. It is not thought desirable to depart from the existing location, on the left of the track concerned.

The principles and method of use of lever-collars as reminders are the same on this route-lever frame as on an ordinary one, and the accident was due mainly to a failure to act on the reminder immediately it was removed, coupled perhaps with the adoption of an unorthodox method of protection. Griffiths and two other signalmen expressed themselves as satisfied with this type of frame, now in satisfactory use for about 10 years. The special features of the signalling system had no indirect bearing on his mistake.

## QUESTIONS IN PARLIAMENT

### Children Killed on Southern Railway

Brigadier-General Clifton Brown (Newbury—U.), on November 30, asked the Minister of Transport how many of the five trespassers who met their death from the live rail on the Southern Railway this year were children, and how many were adults; and how many miles of the electric rail were still unprovided with the new protective fencing.

Dr. Leslie Burgin: All five, I regret to say, were children. I am informed by the Southern Railway Company that 47 miles, in the aggregate, of this fencing have been erected and that the total route mileage of the company's electrified track is about 663 miles, the great bulk of which is immune from trespass by children.

### Rail Accidents

Sir Frank Sanderson (Ealing—U.), on November 30, asked the Minister of Transport if he would state the total number of casualties on the roads of Great Britain exclusive of those in which private cars were concerned; and the total number of casualties on the railways for the years 1936, 1937, and 1938 respectively.

Dr. Leslie Burgin (Minister of Transport): My hon. friend will find the information he desires, so far as it is known, in the following annual publications for 1936 and 1937: "Road Accidents Involving Personal Injury"; and "Report upon Accidents which occurred on the Railways of Great Britain." Both are available in the library. The corresponding information for 1938 will be published in due course.

### Railway Position

Mr. C. Wood (York—U.), on December 1, asked the Minister of Transport whether in connection with the recent representations which he had received

from representatives of the four main-line groups with regard to the present railway position he had given consideration to the views of the light and other minor railway companies; and whether he would give an assurance that in taking any action in this matter or in setting up any enquiry he would have due regard to the interests of such companies.

Dr. Leslie Burgin (Minister of Transport): I can assure my hon. friend that in connection with any action that I may take arising out of the representations to which he refers the interests of the non-amalgamated railway companies will not be overlooked.

### Breakdowns on the Underground

Mr. G. F. Doland (Balham and Tooting—C.), on December 7, asked the Minister of Transport whether he would inform the House how many breakdowns had taken place on the underground railway serving Balham and Tooting, causing inconvenience to passengers, during the past five years; and how many breakdowns occurred on the same railway during the previous five years.

Dr. Leslie Burgin: I am informed by the London Passenger Transport Board that the number of delays of 30 minutes or more on this line was 21 during the five years 1934 to 1938, compared with 24 during the five years 1929 to 1933. These figures do not, of course, include the period from September 27 to October 7 last, during which the tunnels under the Thames were closed.

### London Transport

Mr. R. De la Bere (Worcester, Evesham—U.), on December 7, asked the Minister of Transport whether he would consider introducing legislation to amend the London Passenger Transport Act to provide for the holding of an annual general meeting.

Dr. Leslie Burgin: I cannot see my

way to adopt my hon. friend's suggestion.

Mr. De la Bere asked if the Minister was aware of the inexplicable muddle which had arisen since the creation of the London Passenger Transport Board, and the Northern Ireland Road Transport Board, both examples of nationalisation bringing demoralisation and disturbing influences.

Dr. Burgin: I thought the London Passenger Transport Board was an excellent example of a public utility very well run.

### Railways and Carriers' Licences

Mr. Ben Smith (Bermondsey, Rotherhithe—Lab.), on December 7, asked the Minister of Transport if he would give the number of cases in which the railway companies had opposed the granting of carriers' licences for road transport since the passage of the Road and Rail Traffic Act, 1933.

Dr. Leslie Burgin: This information could be obtained only by re-examination of the applications, numbering well over 250,000, which have been made for "A" and "B" licences or licence variations since the Act came into operation. Particulars of certain objections are given in the published annual reports of the licensing authorities.

### Railway Companies' Road Haulage Business

Mr. Ben Smith (Bermondsey, Rotherhithe—Lab.), on December 7, asked the Minister of Transport whether he had any figures showing the volume of road-haulage business carried on by the railway companies and their contractors, and the amount of capital invested by the railway companies in road transport undertakings.

Dr. Leslie Burgin: In 1937 the tonnage of non-railborne merchandise traffic conveyed by the four main-line railway companies under their Road Transport Acts of 1928 was 859,153 tons. No information is available as to the volume carried by contractors. The amount of capital invested by the



four main-line railway companies in other road transport undertakings at December 31, 1937, was approximately £4,400,000 in undertakings mainly engaged in goods transport and £9,300,000 in undertakings mainly engaged in passenger transport.

#### Minister's Meeting with Railway Companies

Mr. J. Parker (Essex, Romford—Lab.), on December 7, asked the Minister of Transport whether he had had a further meeting with the representatives of the railway companies; and what was the result.

Dr. Leslie Burgin: Officials of my Department met the general managers of the four main-line railway companies last Thursday, and the chairmen and general managers are seeing me again tomorrow.

#### Railway Companies' Representations

Mr. D. J. B. Joel (Dudley—U.), on December 7, asked the Minister of Transport whether, in putting forward their claim in respect of rate-charging, the railway companies equally abandoned on their part any desire to continue the advantages of derating or of preferential taxation of heavy oil and kindred benefits.

Dr. Leslie Burgin: The representations made to me by the railway companies have been confined to a request for the repeal of the existing statutory provisions governing the charges and conditions for the conveyance of merchandise traffic by rail.

#### Co-ordination of Transport

Mr. J. Parker (Essex, Romford—Lab.), on December 7, asked the Minister of Transport whether, in view of the difficulties of the railway companies, he was taking any steps to promote the co-ordination of the railway, road transport, inland waterway, and coastwise shipping services as complementary parts of the country's transport system.

Dr. Leslie Burgin: The whole question of the co-ordination of transport is receiving my earnest consideration in the light of the Reports of the Transport Advisory Council on Service and Rates and of the representations made to me by the railway companies and other interests concerned.

Mr. D. Kirkwood (Dumbarton Burghs—Lab.) asked the Minister if he could tell the House what was going to be the result of his considerations.

Dr. Burgin replied that the railway companies had recently submitted a memorandum. They were asked to supply further information. Some of them had been received and the chairmen and general managers were seeing him tomorrow in further explanation of their requests.

Sir John Haslam (Bolton—C.) asked if the Minister would take care when the reports came that a large monopoly was not created.

Mr. V. McEntee (Walthamstow West—Lab.): When the Minister takes into consideration the railways' case

will he consider whether they are not very much over capitalised?

Dr. Burgin: That will be one of the questions.

#### Railway Services

Mr. Adamson (Stafford, Cannock—Lab.), on December 7, asked the Minister of Transport, whether, in view of the development of the carriage of goods by road as a modern form of transport with pronounced advantages, he was giving consideration to the problem of adapting the railway services to the changing conditions; and had he reached any conclusions.

Dr. Leslie Burgin: Railway services are primarily a matter for the railway company, whose managements have constantly under review steps which may be necessary to adapt the railways and their methods of working to modern requirements. I am always ready to bring to the attention of the railways any practicable proposals, and if the hon. member has any specific suggestions I shall be glad to consider them.

#### Carriers' Licences

Mr. H. W. Butcher (Holland with Boston—L.N.), on December 7, asked the Minister of Transport whether, on granting hauliers' licences to railway companies for road-haulage vehicles, care was taken to ensure that the rates to be charged were adequate to cover the cost of the services to be performed; and whether he was aware that any losses on road transport services sustained by railway companies could be made good from other sources of income, and that independent transport concerns were compelled to accept the same rates and, having no other revenue, were able to discharge their obligations under the Traffic Acts only with considerable difficulty.

Dr. Leslie Burgin: When granting carriers' licences the Traffic Area Licensing Authorities have no power to attach conditions as to the rates to be charged, but I understand that they take into account any evidence that traffic is being obtained by unfair means. I cannot assent to the suggestion contained in the latter paragraph of my hon. friend's question.

#### Railway Rates

Sir Joseph Leech (Newcastle-upon-Tyne, W.—C.), on December 7, asked the Minister of Transport whether his attention had been drawn to the fact that although the volume of railway goods traffic was unsatisfactory the volume of railway traffic in returned empties had greatly increased; and what steps he proposed to take to adjust the anomaly by which the present railway freight rates for goods enabled road transport concerns to select remunerative goods traffic and to throw the unremunerative returned empties freight traffic on to the railways.

Sir Frank Sanderson (Ealing—C.) asked the Minister of Transport whether, in view of the serious economic position of the railways, which was prejudicing their efficiency and ability to meet calls that might be made on them in a national

emergency, he would consider removing, as soon as possible, the statutory controls and regulations which were a century old and which were put into operation when there was no other form of competitive transport.

Dr. Leslie Burgin: The points to which my hon. friends refer are aspects of the general question of control over railway rates which is under consideration in connection with the recent representations by the railway companies.

### Parliamentary Notes

Bills are being promoted for the coming Session by the London & North Eastern Railway Company; the London Midland & Scottish Railway Company; the London Passenger Transport Board; and the Southern Railway Company.

The L.N.E.R. (Superannuation Fund) Bill seeks statutory authority for the scheme of consolidation of the superannuation funds of the constituent companies which is explained under "Staff and Labour Matters" on page 1008 of this issue. The Bill also proposes to dissolve Thompson McKay & Co. Ltd., and to provide for the distribution of its assets.

By the L.M.S.R. Bill, power is taken to acquire lands in Wheathampstead, Harpenden, and Nottingham; to stop up and discontinue a portion of the Lancaster Canal in the borough of Kendal; and to extend the time (i) for completion of a short railway authorised by the L.M.S.R. Act, 1934, in the urban district of Hazel Grove and Bramhall, which will connect the New Mills and Heaton Mersey line with the Stockport and Buxton line; (2) for compulsory purchase of lands in Alderley Edge, Wilmslow, St. Pancras, and Abergale.

Among the purposes of the London Passenger Transport Board Bill are the running of trolley vehicles on new routes in the boroughs of Southwark, Camberwell, and Kingston-on-Thames; also the construction of ventilating subways in various parts of London, and enlargement of tunnels at certain points on the underground railways.

Tunnel enlargements on the Waterloo & City Railway and the provision of escalators in connection with that railway are included in the Southern Railway Bill, which also proposes abandonment of the subway authorised by the Act of 1931. Alterations are intended of the levels and gradients for over 2 miles in Surbiton and Leatherhead of portions of the railway authorised by the Act of 1930 and of railway No. 1 authorised by the Act of 1935. Extensions of time are asked for the completion of the railway of 4 miles authorised by the Act of 1934, which will give an alternative route between Folkestone and Dover, and for compulsory purchase of lands. Removal of the limitation prescribed by Section 32 of the Act of 1938 as to maximum charges at Southampton Docks is also sought.

## Rail and Road: Removal of Restrictions

In *The Times* of Wednesday Mr. Horace Hernu suggested as an equitable solution of the difficulties resulting from the differences in methods of charging between road and rail transport, that the removal of railway rate restrictions should be accompanied by the withdrawal of the railways from holding shares in road haulage undertakings, coupled with a relaxation of road transport restrictions subject to the provision of certain safeguards. Below is the full text of Mr. Hernu's letter, alongside which we publish Sir Ralph Wedgwood's comprehensive reply in *The Times* of December 8:—

### Mr. Hernu's Suggestions

TO THE EDITOR OF THE TIMES

SIR.—You have recently published in your columns letters dealing with the much advertised appeal of the railways for a fair deal from transport experts and from partisans of both rail and road transport, but I think it is very doubtful whether the man in the street has before him a clear picture of the issue involved.

What are the restrictions of statutory control which the railways desire to have removed, and, if carried into effect, what would be the result? In simple language and avoiding technical phraseology, the restrictions consist of:—

(1) The railways' inability to quote rates which are not applicable equally in both directions—*e.g.*, from London to Liverpool and *vice versa*.

(2) Their inability, with trivial exceptions, to quote lower rates for important traffics than those applicable for small traffics—*i.e.*, unlike the practice obtaining in commerce generally they are compelled by their regulations to quote the same rates to the big customer handing them thousands of tons annually as to the customer whose traffic is occasional and small.

(3) The railways have not the power to discriminate, and are compelled to accept any traffic tendered to them for conveyance over their system. This works unfairly and results, in some cases, in firms employing road transport for important consignments and only utilising the railways for small lots, which involve numerous operations and deliveries.

These are the main disabilities of the railways, which are not shared by road transport undertakings. What would result if these obviously unfair conditions were removed?

Approaching this question in the interests I represent as a user to some considerable extent of both rail and road and sea transport, it is obvious that, like the ordinary trader, I have to contemplate the possibility of a rate-cutting war between rail and road, and the likelihood that the railways, having the greater financial power, would eventually kill or acquire the road transport undertakings, thus obtaining a monopoly, with the result that rates would be increased.

What are the restrictions of road transport?

Apart from the regulations as to wages and fitness of the vehicles, which, in the main, are reasonable, these are:—

(1) Restriction to an increase in their fleets, which is invariably opposed most vigorously, and generally with success.

(2) The difficulty and opposition to new road transport undertakings establishing themselves and obtaining licences.

That both rail and road transport are necessary is generally accepted, and it is further agreed that co-ordination between the two is desirable. This, however, is little more than a pious hope, at present, that is unlikely to be realised to any appreciable extent as long as the present restrictions of both rail and road transport continue to exist.

An equitable solution of the existing position, and one which would help to pave the way for future co-ordination, would seem to be to remove the above-mentioned restrictions from both road and rail, with the proviso that in the case of road transport the establishment of new undertakings would be subjected to certain safeguards and that, in the case of the railways, they should not acquire, directly or indirectly, any road haulage undertakings, or establish any new ones.

HORACE HERNU,

Geo. Monro Limited, Transport

### Sir Ralph Wedgwood's Reply

SIR.—The letter from Mr. Horace Hernu which you publish today is a valuable contribution to the road and rail discussion, and its fair-mindedness must be appreciated by all parties. It is, nevertheless, difficult for the railways to accept it as a satisfying statement of their case.

The proposal put forward by the railways is simple in principle but intricate in detail, and it is not surprising that Mr. Hernu's list of the restrictions which the railways wish to have removed is neither complete nor correct. . . .

The railways are not asking to be freed from their liability as common carriers, and they have no intention of refusing any traffic which is offered to them in suitable conditions. Where they are common carriers now they will remain common carriers. All they ask is the freedom to charge what rates are appropriate for the goods which, as common carriers, they are bound to carry.

When Mr. Hernu turns to the enumeration of the restrictions upon road transport which should in his view be removed it is easier to follow his recommendations, but one may perhaps doubt whether he fully understands the scope of what he is proposing.

Mr. Hernu advocates that the restrictions at present imposed on the increase of motor fleets and the opposition to new road transport undertakings obtaining licences should be abolished. How far does this carry us?

At present when a new road transport undertaking seeks to obtain a licence to ply on the public roads other carriers, whatever their form of transport, have a right to be heard and to contend that adequate means of transport already exist. If these contentions are judged to be unfounded the Commissioner grants the licence. The same applies when an existing undertaking seeks to increase its fleet.

If this restriction is removed, existing carriers of all kinds will lose their right of opposition, and licences will presumably be granted to any applicant who is willing to pay the licence duty and obey the regulations as to wages and fitness of vehicle.

This is a complete change in the principles governing the issue of licences for freight transport by road, and in effect throws the public roads open to every one who can pay the first instalment on a motor-lorry. Is it what Mr. Hernu really wants?

The railways have no more direct interest in the matter than the road transport industry. If the claims of existing carriers are to be disregarded they will suffer along with existing road carriers. It is all a question of the public interest. The railways know too well the deadening effect of out-of-date restrictions in their own case to wish to perpetuate them in the case of their competitors.

As a last point, may I add that the railways are in full agreement with Mr. Hernu in his advocacy of co-ordination between rail and road transport? I submit, however, that this object would be defeated if effect were given to Mr. Hernu's suggestion that the railways should not be permitted to acquire any road haulage undertaking or establish any new ones. This would mean a withdrawal of the rights accorded to the railways by Parliament under their Road Transport Acts of 1928. It is fair to recall that in the sphere of passenger transport the acquisition of road powers by the railways was by far the most important legislative step towards the practical co-ordination of passenger transport facilities by rail and road. The railways used their powers not to establish new competitive services on the roads but to enter into partnership with all the important omnibus companies throughout the country, apart from London. The result is evident in the fact that the public of this country are now supplied by rail and road with the best system of passenger transport in the world.

I submit, therefore, that the possibility of an extension of railway interest in road haulage should not be excluded from consideration if a co-ordinated system of rail and road goods transport is the object in view.

R. L. WEDGWOOD,

Chairman, General Managers' Committee

## Progress of the "Square Deal" Campaign

Further memorandum, amplifying that submitted on November 23, presented to the Minister of Transport by the railways on Thursday

The deputation of chairmen and general managers of the four main-line railways which on November 23 handed to the Minister of Transport a memorandum of proposals for the repeal of existing statutory regulations governing rates for conveyance of merchandise (set out in full on page 916 of our November 25 issue), had a further conference with the Minister yesterday (December 8). On this occasion a further memorandum was submitted, elaborating certain points regarding which the Minister had asked for more information. The memorandum is set out below.

### Text of Memorandum

(1) The Minister, when he received the chairmen and general managers of the railways on November 23, asked them to amplify that part of their memorandum which dealt with the action to be taken. In particular he requested that they should indicate the nature of the measure which they would ask the Minister to present to Parliament and their reasons in support of it.

(2) The railways have endeavoured in this second memorandum to meet the Minister's wishes.

(3) The legislation which the railways have in view would be short and comprehensive and in effect would enable them to make in respect of the carriage of merchandise such charges as are appropriate to the traffic to be carried. This would entail the repeal of Part III of the Railways Act, 1921, and also of various other Acts and sections of Acts. The proposals of the railways do not extend to passenger fares and the legislation would, therefore, continue the Railway Rates Tribunal in existence. It is suggested that as regards these fares the proposed legislation might apply machinery somewhat analogous to that which exists with regard to the fares of the suburban passenger services of the railways under the London Passenger Transport Act, 1933.

(4) The foregoing paragraph indicates the scope of the legislation which the railways have in view. They submit that nothing less would achieve the object which they are commending to the Minister, namely, equality with road transport.

(5) It may be well to review the position of road transport in respect of charges for merchandise.

(6) A road haulier when applying for an "A" or "B" licence may at the discretion of the licensing authority be required to supply particulars of the traffics which he expects to carry and of the rates which he is at present charging. Whatever may be the object of this requirement, the licensing authority has no jurisdiction to modify the rates submitted by an applicant for a licence nor can any condition be laid down that the rates shall in fact be charged.

(7) A road haulier is in fact entirely at large with respect to the charges which he may make for the carriage of freight. There is no obligation on him to conform to an intricate classification or to go to a court of law whenever he wants to make a substantial cut in a rate or wants to increase it by the smallest fraction. He has complete liberty to vary his charges upward or downward as he may think appropriate, or in a word, he is allowed to carry on his business. If he abused his freedom he would lose his business.

(8) The railways are in the same position in that they too have a vigilant public and alert competitors. They are equally anxious not to lose business. They submit that their sense of responsibility to the public, their staff and all the interests which they serve is in no danger of being undermined if the restrictions which impede them are removed.

(9) The railways claim that their record since amalgamation in their dealings with traders and trading bodies entitles them to be regarded as pursuing an enlightened and broad-minded policy in all questions of merchandise charges. They respectfully submit that the consideration of their present

proposals should be undertaken against this background, and they should not be exposed to the suspicion that they will abuse the freedom for which they are asking.

(10) Leaving aside the record of the railways and the confidence which, we believe, it has created in the minds of the trading public, we submit that if it should prove that this confidence has been misplaced, effective means exist by which Parliament could bring them to a sense of their shortcomings.

(11) The Minister referred especially to the case of the heavy industries. He expressed the view that in relation to these industries the railways might still exercise something like monopoly powers, and he indicated that it would be desirable to consider in their case whether something in the nature of special safeguards should be provided, in the event of the railway companies' general proposals proving acceptable.

(12) The railways have given the matter careful thought and submit the following considerations:—

(i) The extent of the monopoly possessed by the railways so far as it can be said to exist is very limited. Neither the coal industry nor the iron and steel industry is confined to rail transport.

Large quantities of household and industrial coal now pass by road, and the radius of distribution is extending, whilst in the case of iron and steel large quantities of pipes, structural material, tinplates, &c., are carried by road and in ever-increasing volume.

(ii) Any general attempt to increase railway charges on the traffics of the heavy industries would naturally tend to divert a larger proportion of their materials and output to competing forms of transport. The railway companies would not lightly incur such a risk.

(iii) Any partial or discriminatory attempt to raise charges would be exposed to the same risk over the narrower field affected. It is doubtful if there is a single firm in the heavy trades which could not increase the proportion of its road transport in retaliation for any action which it regarded as inequitable on the part of the railways.

(iv) The heavy industries are efficiently organised and can readily defend themselves or their individual members against unfair or oppressive action by a railway.

(13) Having regard to the foregoing considerations, the railways do not feel that any special safeguards applicable to the heavy industries are really necessary.

(14) The Minister has invited the railways to specify particular features in the present system of regulation, as it applies to merchandise charges, which are felt as exceptionally galling. The railways regret that they cannot follow the Minister into this field. They are not seeking for a little relief which may perhaps help them to keep up the unequal battle through another round; they are seeking for equality with other forms of transport, and they believe that the sense of justice of the country will support this elementary demand.

(15) The Minister has also asked the railways to indicate what use they would make of this equality if it were granted. The railways are glad of this opportunity of doing so.

(16) In asking for equality in the matter of charges for merchandise, the railways have no scheme in mind for embarking on an increase of rates, either in general or as affecting any particular industry; equally they do not contemplate making wholesale reductions and plunging into a rate war with other forms of transport. Their charges will be known and available to their customers just like the price-list of any large manufacturer or retail-dealer, and they will be varied in the same way as circumstances may demand.

(17) In any action which they may take the railways will keep clearly before them the advantage to the public and to the transport industry as a whole of a co-ordinated



industry. They believe the new conditions for which they are asking, by putting the various competing forms of the industry on equal terms, will promote this object and not hinder it.

(18) They would remind the Minister that this view is supported by previous experience. When the railways received their road powers in 1928 the fear was freely expressed that they would use the powers to embark on a campaign of cut-throat competition with the existing omnibus companies. Nothing of the sort occurred—the railways and the omnibus companies entered into a friendly partnership, under which a striking degree of co-ordination has been effected, and the public enjoys the most efficient road passenger service in the world.

(19) This result was made possible only by granting the railways the right to compete on equal terms in road passenger transport. The railways would wish to express the modest hope that similar results may flow from similar causes in the case of freight transport.

(20) The railways are conscious that the Minister attaches importance to the objective of establishing some system of rate regulation applicable not only to road transport but to the transport industry generally. They submit that in this direction also their proposals will help, and not hinder the end in view.

(i) The present system of railway rate control is governed by the principle of standard revenue which involves standard charges based upon an elaborate classification. No such principle is applicable, or could be applied to other forms of transport. It would therefore be impossible to apply the same system of control to transport generally. While the existing system of railway rate control continues, the hope of unified control could hardly be realised. This is an important factor in the proposal which the railways have submitted to the Minister.

(ii) The co-ordination between road and rail, which in the view of the railways is likely to advance more rapidly as the result of equality of conditions between the two forms of transport, will of itself help powerfully towards the establishment of a uniform system of control since it presupposes some considerable measure of agreement on equivalent rates and charges.

(iii) The larger and more responsible road concerns are anxious to assist the Minister but their efforts are defeated by a less responsible section who see their salvation in maintaining a completely free hand. When the railways are put in a position of equality with road hauliers the possibility of competition will make them more willing to see the need of conforming to a general rates structure.

(21) In general, the railways feel that their proposals, by conferring equality on all the competitors in the transport industry, will contribute substantially towards the achievement of co-ordination and regulation in the industry, but it is not possible at this stage to outline the precise form which the ultimate structure of rate control should take. At the present time road rates and charging practices appear to be too fluid and too disparate for any form of control to be made effective within a reasonable time.

(22) This memorandum can deal only with the leading issues involved in the proposals made by the railways. Doubtless many other important questions will emerge from their consideration. The railways submit, however, that these can only usefully be considered when the general principles of de-restricting the railways, in respect of their charging powers for merchandise, has been accepted as desirable and urgent.

(23) The railways would therefore respectfully ask the Minister to inform them whether the broad proposals which they have put forward are approved by the Government for urgent action.

#### Reference to Transport Advisory Council

The Minister, at the close of the discussion yesterday, announced his intention of remitting the question for the urgent consideration of the Transport Advisory Council, which under the powers of the Road and Rail Traffic Act, 1933, was set up to advise him in the "discharge by him of his functions in relation to means of, and facilities for, transport, and their co-ordination, improvement, and development."

#### Meeting with Parliamentary Transport Committee

Previous to yesterday's meeting with the Minister of Transport, the railway representatives on Wednesday night had attended a meeting of the Conservative Parliamentary Transport Committee at the House of Commons. Sir Ralph Wedgwood, who was accompanied by Sir James Milne, Sir William Wood, Mr. Gilbert S. Szlumper, and Mr. G. Cole Deacon, told the meeting why the companies think it necessary that the railway rates system should be freed from the present restrictions so that the railways, in the matter of charges, shall be on a basis of equality with other forms of transport.

Next week the Transport Committee will hear representatives of road transport interests. Sir Isidore Salmon is Chairman of the committee, and Lt.-Colonel Heneage is Secretary.

## RAILWAY AND OTHER REPORTS

**Metropolitan Railway Country Estates Limited.**—The board recommends a dividend of 6 per cent. for the year ended October 31 last, transferring £10,000 to general reserve and carrying forward £33,742. For the previous year 5 per cent. was paid, £15,000 went to reserve, and £28,646 was carried forward.

**Northern Ireland Road Transport Board.**—The board announces that no dividends will be forthcoming on January 1 on any of its stocks. This decision has been reached in view of the present uncertainty of the position following the report of the McLintock Committee and that of the Recorder of Belfast into transport in Northern Ireland.

**Bengal & North Western Railway Co. Ltd.**—The board recommends a final dividend for the year ended September 30, 1938, of 7 per cent., together with a bonus of 3 per cent. on

the company's ordinary stock, making with the ad-interim dividend and bonus of 8 per cent. paid in July, 1938, a total of 18 per cent. per annum. The dividend and bonus will be payable, less income tax, at 3s. in the £, on January 30, 1939.

**Rohilkund & Kumaon Railway Co. Ltd.**—A final dividend is recommended for the year ended September 30, 1938, of 6 per cent., together with a bonus of 4 per cent. on the company's ordinary stock, making with the ad-interim dividend and bonus of 8 per cent. paid in July, 1938, a total payment of 18 per cent. per annum. The dividend and bonus will be payable, less income tax at 2s. 11d. in the £, on January 23, 1939.

**Chloride Electrical Storage Co. Ltd.**—Interim dividends in respect of the year to March 31, 1939, are to be paid on December 1, of 5 per cent. on

the ordinary A and B stocks, less tax, the same as a year ago. Trading results, although not unaffected by prevailing world conditions, are, in the opinion of the directors, satisfactory.

**Jonas Woodhead & Sons Ltd.**—A dividend is recommended of 10 per cent., less tax, for the year ended August 31, 1938, the same as for the year 1936-37.

**Central Wagon Co. Ltd.**—A final dividend of 5 per cent. and a bonus of 2 per cent. are announced, bringing the total distribution for the year ended September 30, 1938, to 10 per cent.

#### Forthcoming Meetings

Dec. 14 (Wed.)—**Madras & Southern Mahratta Railway Co. Ltd.** (Ordinary General), 123, Victoria Street, Westminster, S.W.1, at noon.

Dec. 15 (Thurs.)—**Cordoba Central Railway Co. Ltd.** (Ordinary General), River Plate House, Finsbury Circus, E.C., at 2.30 p.m.

## NOTES AND NEWS

**Southern Railway Smoking Carriages.**—As from yesterday (December 8), smoking has been permitted in all Southern Railway carriages except those labelled "No smoking" inside a red triangle. The old types of "smoking" and "no-smoking" signs are being removed.

**Internal Air Lines Merger.**—The formation is announced of a new company known as Great Western & Southern Air Lines, to operate the internal air services maintained by the Great Western Railway, the Southern Railway, and Channel Air Ferries Limited. The company has a capital of £100. The subscribers are Mr. John S. Wills, who is a Member of Council of the British Electrical Federation, and Mr. John B. Elliot, Assistant General Manager of the Southern Railway.

**L.M.S.R. Freight Services Speed-up.**—The L.M.S.R. announces the acceleration of 16 additional freight trains to effect a total saving in journey time of 17 hr. 54 min. a day, or 17 per cent. Twelve of the accelerated trains are on Scottish services, including Glasgow—Carlisle, Aberdeen—Perth, Aberdeen—Carlisle, Glasgow—Edinburgh, Hamilton—Dundee, Perth—Inverness, and Inverness—Wick. The greatest individual speed-up is 148 min. in the running of a freight train from Aberavenny to Bushbury (Wolverhampton).

**Railway Benevolent Institution Casualty Fund.**—The Railway Benevolent Institution Casualty Fund collection is now being made. A subscription of 1s. secures a return of about 3s. 6d. a week to a member whilst he is disabled by accident (£5 maximum); £5 to the widow of a member killed; and £3 to the widow of a member dying from natural causes during the year of membership. Benefits are paid irrespective of other income. Subscriptions will be received by any stationmaster or agent, from whom particulars are available.

**Sixth Avenue (New York) Elevated Closed.**—At midnight on December 4 the Sixth Avenue elevated line in New York City was closed, in accordance with a decision taken by the New York City Board of Estimate on Friday of last week. It is understood that the work of demolition will begin immediately, and must be completed within 90 days. We have referred more than once within the past few weeks to the suggested abandonment of this line, and the decisive step was taken on October 13, when this portion of the Manhattan Railway Company's property was sold at auction for \$12,500,000 to the Merle-Smith bondholders' protective committee. That committee transferred the property to the city authorities at the same price, but receives only \$3,500,000 in cash, as the balance of \$9,000,000 will be retained by the municipal authorities to meet tax claims. Construction work is already

well advanced on a new branch of the Independent Subway system under Sixth Avenue to replace the "El" line.

**Argentine Railways' Purchase.**—The Senate Public Works and Finance Committees, according to an Exchange Telegraph message, have reported favourably on the project to purchase the Cordoba Central and the Argentine Transandine Railways. The matter will come up for discussion in the Senate on December 20.

**Manchester Ship Canal Staff Dinner.**—The annual dinner of the railway clerical staff of the Manchester Ship Canal Company was held at the Exchange Hotel, Manchester, on December 3, attended by over 80 members of the present and past staff. Mr. C. E. Hutchinson, Dock Railway Superintendent, presided, and in welcoming the guests extended a hearty welcome to Mr. Kissane, the Secretary of the company, and also to Mr. Bruce, newly appointed Docks Manager, and congratulated the latter upon his appointment. Mr. Kissane replied for the guests and Mr. Bruce in his reply outlined his services with the company, which extended over a period of 46 years, and thanked the staff for the toast which had been proposed in his honour. A very successful and enjoyable evening concluded with a musical programme.

**Reduced L.N.E.R. Services.**—The L.N.E.R. announces that from Monday next, December 12, certain regular passenger trains now in operation will cease to run. Most of the trains concerned are working on branch lines and carry few passengers, but, in addition, certain express trains between London and Cambridge and Norwich; Sheffield and Manchester; Nottingham and Sheffield; and Leicester and Nottingham will be cancelled. The withdrawal of these trains is attributed to the serious drop in traffic and the consequent demand for economy. The principal withdrawals are as follow:—

11.10 a.m. Liverpool Street to Cambridge, to run Thursdays only.  
2.20 p.m. Cambridge to Liverpool Street, to run Thursdays only.  
11.52 p.m. (S.O.) Liverpool Street to Norwich.  
10.28 p.m. (S.O.) Norwich to Liverpool Street.  
4.55 p.m. Marylebone to Manchester, withdrawn between Sheffield and Manchester.  
9.9 a.m. Nottingham to Sheffield, to run Saturdays only.  
2.5 p.m. Sheffield to Nottingham, to run Saturdays only.  
8.42 p.m. Peterborough to Cleethorpes, to run Tuesdays, Wednesdays, and Thursdays only.  
7.15 a.m. Grimsby to Peterborough, to run Tuesdays, Wednesdays, and Thursdays only.  
12.24 p.m. (S.X.) Grantham to Lincoln, to run Mondays only.  
1.26 p.m. Lincoln to Grantham, to run Mondays only.  
12.46 p.m. Grantham to Skegness, to run Mondays and Saturdays only.  
4.40 p.m. Skegness to Grantham, to run Mondays and Saturdays only.

Halifax, Keighley, and Bradford Sunday services are to be cancelled, except for one non-stop train in each direction to

connect with London trains. References to L.N.E.R. train service reductions, which came into force on October 31 last, were made in our issues of October 28 (page 746) and November 4 (page 801).

**Southern Electric Extension to Reading.**—The Southern Railway has announced January 1, next year, as the opening day for the extension of its electric train services to Reading. A new pocket timetable, which has been issued for this event, shows that fast trains will leave Waterloo and Reading at, for the most part, half-hourly intervals (at 24 and 54, and 29 and 59 min. past the hour respectively), taking approximately 1 hr. 15 min. for the 43½ mile journey between termini. All the nine stations between Staines and Reading will be served by every train, but in the majority of cases the Staines-Waterloo section will be run non-stop.

**Novel Station Lighting, L.N.E.R.**—A novel system of gas-electric lighting has been installed experimentally at North Berwick station, L.N.E.R. Two single- and three double-mantle gas lamps have been fitted above the platforms and air is applied by pressure to the lamps, the pressure being obtained by means of a small electric air blower. The single-mantle lamps consume 5 cu. ft. of gas an hour and give about the same illumination as a 100 W. electric lamp. The double-mantle lamps consume 10 cu. ft. of gas an hour and give rather greater illumination than 150 W. lamp. The new lamps can be switched on and off by means of ordinary electric switches.

**Northern Ireland Transport: New Bill to be Introduced.**—The Governor's speech, at the opening of the new session of the Northern Ireland Parliament on Tuesday, contained the following reference to road transport. "The situation which has arisen in regard to the operation of the Road & Railway Transport Act, 1935, has been causing much concern to my Government. This matter has been the subject of two separate and exhaustive inquiries and the very important issues dealt with in the valuable and informative reports will be considered with a view to the formulation of proposals to deal with the situation, and these will be embodied in a measure to be introduced at an early date."

**Another "Grande Finale."**—On December 7, Driver F. W. Street (to whose enterprise in working the Cheltenham Flyer punctually under difficulties reference was made in the December 2 issue of THE RAILWAY GAZETTE) made his last journey before retirement on the Bristolian, and once again the recorded performance fully reflected this driver's skill and tenacity. With locomotive No. 5036, *Lyons Hall Castle*, and seven vehicles, 230 tons tare, he reached Bristol in a gross time of 100 min. 51 sec., including a p.w.s. to 55 m.p.h. at Twyford, and very easy running from Bath (passed in 86¼ min. from Paddington); notwith-

standing a strong south-west wind, the high maximum of 95 was reached at Dauntsey, and the unusual one (for the down journey) of 83½ at Chelsey. His return journey constituted a triumphant climax, as he actually brought the train into Paddington on time, after three minor signal checks, a severe one (to 10 m.p.h.), and the caution necessitated by the hand-signalling arrangements in force outside the terminus; maxima attained were 89 m.p.h. at Little Somerford and 88½ at Wantage Road, and the accelerations after the various hinderances *en route* were among the most notable features of the run.

**G.W.R. (London) Dramatic Society.**—On December 1, 2, and 3, the Great Western Railway (London), Dramatic Society gave three performances of Ian Hay's comedy "The Housemaster" at the Park Theatre, Hanwell, and on Monday last, December 5, a fourth performance was given at the Fortune Theatre, Drury Lane. The part of Charles Donkin, the house-master, was played by Mr. William

Morris, and that of Barbara Fane by Miss Margaret White. Sir James Milne, General Manager, is the President of the Great Western Railway (London) Dramatic Society, and Mr. F. R. Potter, Superintendent of the Line, is the Chairman. The performance at the Fortune Theatre last Monday evening was witnessed by the author, "Ian Hay," and a number of the chief officers of the G.W.R. and their guests. Those present included:—

Lord Palmer, Deputy Chairman, Great Western Railway; Sir James Milne, General Manager; Mr. Frank Potter, Superintendent of the Line; Mr. F. R. E. Davis, Secretary; Mr. C. R. Dashwood, Chief Accountant; Mr. R. Carpmal, Chief Engineer (who brought with him as his guests, members of the Indian Pacific Locomotive Committee, viz.: Lt.-Colonel A. H. L. Mount, Mr. W. A. Stanier, M. Léguille, Mr. E. S. Cox, Rai Bahadur P. L. Dhawan, and their ladies); Mr. A. S. Quartermaine, Deputy Chief Engineer; Mr. C. T. Cox, London Divisional Superintendent; Mr. H. Wheeler, Principal Assistant to the General Manager; and Mr. P. W. Pine, Solicitor's Department.

At the conclusion of the performance, Mr. P. Grumbridge, the producer, and the whole cast were enthusiastically received.

## British and Irish Railway Stocks and Shares

Stocks	Highest 1937	Lowest 1937	Prices	
			Dec. 7, 1938	Rise/ Fall
G.W.R.				
Cons. Ord. ....	67 <sup>5</sup> / <sub>8</sub>	55 <sup>3</sup> / <sub>4</sub>	27 <sup>1</sup> / <sub>2</sub>	—
5% Con. Prefce. ....	127	108	77	-3
5% Red. Pref. (1950) ..	113	109	95 <sup>1</sup> / <sub>2</sub>	-2
4% Deb. ....	113 <sup>5</sup> / <sub>8</sub>	102 <sup>1</sup> / <sub>2</sub>	98 <sup>1</sup> / <sub>2</sub>	-1
4 <sup>1</sup> / <sub>2</sub> % Deb. ....	118	106	101 <sup>1</sup> / <sub>2</sub>	-1
4 <sup>1</sup> / <sub>2</sub> % Deb. ....	124 <sup>1</sup> / <sub>2</sub>	112	107 <sup>1</sup> / <sub>2</sub>	-2
5% Deb. ....	136 <sup>1</sup> / <sub>2</sub>	122 <sup>3</sup> / <sub>4</sub>	121 <sup>1</sup> / <sub>2</sub>	-1
2 <sup>1</sup> / <sub>2</sub> % Deb. ....	76	64	64 <sup>1</sup> / <sub>2</sub>	—
5% Rt. Charge ....	1337 <sup>1</sup> / <sub>8</sub>	118	117 <sup>1</sup> / <sub>2</sub>	-1
5% Cons. Guar. ....	133 <sup>3</sup> / <sub>4</sub>	116 <sup>1</sup> / <sub>2</sub>	106	-1
L.M.S.R.				
Ord. ....	361 <sup>8</sup> / <sub>8</sub>	25 <sup>5</sup> / <sub>8</sub>	12	-1 <sup>4</sup> / <sub>8</sub>
4% Prefce. (1923) ....	82 <sup>1</sup> / <sub>2</sub>	65 <sup>3</sup> / <sub>4</sub>	25 <sup>1</sup> / <sub>2</sub>	—
4% Prefce. ....	92 <sup>1</sup> / <sub>2</sub>	77 <sup>3</sup> / <sub>4</sub>	45 <sup>1</sup> / <sub>2</sub>	-1
5% Red. Pref. (1955) ....	107 <sup>3</sup> / <sub>4</sub>	102	71 <sup>1</sup> / <sub>2</sub>	-2
4% Deb. ....	108	99 <sup>1</sup> / <sub>4</sub>	90 <sup>1</sup> / <sub>2</sub> *	-2
5% Red. Deb. (1952) ....	117 <sup>1</sup> / <sub>2</sub>	111	108	—
4% Guar. ....	104	95 <sup>7</sup> / <sub>8</sub>	79 <sup>1</sup> / <sub>2</sub>	-2
L.N.E.R.				
5% Pref. Ord. ....	12 <sup>1</sup> / <sub>2</sub>	6 <sup>3</sup> / <sub>4</sub>	4	—
Def. Ord. ....	6 <sup>1</sup> / <sub>4</sub>	3 <sup>5</sup> / <sub>8</sub>	2 <sup>1</sup> / <sub>4</sub>	—
4% First Prefce. ....	79 <sup>1</sup> / <sub>2</sub>	63	22 <sup>1</sup> / <sub>2</sub>	-1
4% Second Prefce. ....	31 <sup>1</sup> / <sub>2</sub>	21	10	—
5% Red. Pref. (1955) ....	101 <sup>1</sup> / <sub>4</sub>	89 <sup>3</sup> / <sub>4</sub>	41 <sup>1</sup> / <sub>2</sub>	-4
4% First Guar. ....	103	91 <sup>7</sup> / <sub>8</sub>	69 <sup>1</sup> / <sub>2</sub>	-2
4% Second Guar. ....	97 <sup>5</sup> / <sub>8</sub>	85 <sup>1</sup> / <sub>2</sub>	54	-2
3% Deb. ....	84 <sup>1</sup> / <sub>8</sub>	74	65 <sup>1</sup> / <sub>2</sub> *	-1
4% Deb. ....	107 <sup>1</sup> / <sub>4</sub>	98 <sup>1</sup> / <sub>2</sub>	86 <sup>1</sup> / <sub>2</sub> *	-2
5% Red. Deb. (1947) ....	113 <sup>1</sup> / <sub>2</sub>	106 <sup>1</sup> / <sub>2</sub>	104 <sup>1</sup> / <sub>2</sub>	-2
4 <sup>1</sup> / <sub>2</sub> % Sinking Fund	110 <sup>3</sup> / <sub>16</sub>	105 <sup>1</sup> / <sub>2</sub>	103 <sup>1</sup> / <sub>2</sub> *	-2
Red. Deb.				
SOUTHERN				
Pref. Ord. ....	98 <sup>5</sup> / <sub>8</sub>	83 <sup>1</sup> / <sub>2</sub>	57 <sup>1</sup> / <sub>2</sub>	—
Def. Ord. ....	27 <sup>7</sup> / <sub>8</sub>	16 <sup>3</sup> / <sub>4</sub>	12 <sup>3</sup> / <sub>4</sub>	-1 <sup>4</sup> / <sub>8</sub>
5% Pref. ....	126 <sup>1</sup> / <sub>16</sub>	105 <sup>1</sup> / <sub>16</sub>	91 <sup>1</sup> / <sub>2</sub>	—
5% Red. Pref. (1964) ..	118	110 <sup>1</sup> / <sub>4</sub>	100 <sup>1</sup> / <sub>2</sub>	—
5% Guar. Prefce. ....	133 <sup>3</sup> / <sub>4</sub>	116 <sup>3</sup> / <sub>4</sub>	114 <sup>1</sup> / <sub>2</sub>	—
5% Red. Guar. Pref. (1957) ..	118 <sup>1</sup> / <sub>2</sub>	111 <sup>1</sup> / <sub>2</sub>	111 <sup>1</sup> / <sub>2</sub>	—
4% Deb. ....	112	101 <sup>1</sup> / <sub>4</sub>	96 <sup>1</sup> / <sub>2</sub> *	-4
5% Deb. ....	135 <sup>3</sup> / <sub>4</sub>	123 <sup>1</sup> / <sub>2</sub>	120 <sup>1</sup> / <sub>2</sub> *	-2
4% Red. Deb. 1962-67 ..	113	105	104 <sup>1</sup> / <sub>2</sub> *	-2
BELFAST & C.D.				
Ord. ....	5	4	4	—
FORTH BRIDGE				
4% Deb. ....	106	99 <sup>1</sup> / <sub>2</sub>	97 <sup>1</sup> / <sub>2</sub>	—
4% Guar. ....	105 <sup>3</sup> / <sub>4</sub>	99	96	—
G. NORTHERN (IRELAND)				
Ord. ....	11	5	3 <sup>1</sup> / <sub>2</sub>	—
G. SOUTHERN (IRELAND)				
Ord. ....	50	21 <sup>1</sup> / <sub>2</sub>	15	—
Prefce. ....	61	34	15	-2
Guar. ....	94 <sup>3</sup> / <sub>4</sub>	69 <sup>1</sup> / <sub>2</sub>	34	-5
Deb. ....	95	82 <sup>1</sup> / <sub>8</sub>	58	+1 <sup>1</sup> / <sub>2</sub>
L.P.T.B.				
4 <sup>1</sup> / <sub>2</sub> % "A" ....	123 <sup>3</sup> / <sub>4</sub>	110 <sup>1</sup> / <sub>2</sub>	109 <sup>1</sup> / <sub>2</sub>	—
5% "A" ....	135	121 <sup>1</sup> / <sub>2</sub>	117 <sup>1</sup> / <sub>2</sub>	—
4 <sup>1</sup> / <sub>2</sub> % "T.F.A." ..	108 <sup>3</sup> / <sub>4</sub>	104	103	-1 <sup>1</sup> / <sub>2</sub>
5% "B" ....	125	114 <sup>1</sup> / <sub>2</sub>	114 <sup>1</sup> / <sub>2</sub>	+1
5% "C" ....	99 <sup>3</sup> / <sub>4</sub>	75	77	-1 <sup>1</sup> / <sub>2</sub>
MERSEY				
Ord. ....	42 <sup>5</sup> / <sub>8</sub>	22	20	—
4% Perp. Deb. ....	103	96 <sup>3</sup> / <sub>4</sub>	95 <sup>1</sup> / <sub>2</sub>	-2
3% Perp. Deb. ....	77 <sup>5</sup> / <sub>8</sub>	74 <sup>1</sup> / <sub>2</sub>	67 <sup>1</sup> / <sub>2</sub>	-4
3% Perp. Prefce. ....	68 <sup>3</sup> / <sub>4</sub>	61 <sup>1</sup> / <sub>4</sub>	55	—

## British and Irish Traffic Returns

GREAT BRITAIN	Totals for 48th Week			Totals to Date		
	1938	1937	Inc. or Dec.	1938	1937	Inc. or Dec.
L.M.S.R. (6,834 mls.)	£	£	£	£	£	£
Passenger-train traffic...	407,000	415,000	- 8,000	24,894,000	24,904,000	- 10,000
Merchandise, &c. ...	443,000	541,000	- 98,000	21,581,000	24,011,000	- 2,430,000
Coal and coke ...	287,000	319,000	- 32,000	12,028,000	12,406,000	- 378,000
Goods-train traffic ...	730,000	860,000	- 130,000	33,609,000	36,417,000	- 2,808,000
Total receipts ...	1,137,000	1,275,000	- 138,000	58,503,000	61,321,000	- 2,818,000
L.N.E.R. (6,315 mls.)						
Passenger-train traffic...	270,000	281,000	- 11,000	16,134,000	16,237,000	- 103,000
Merchandise, &c. ...	315,000	406,000	- 91,000	15,188,000	16,563,000	- 1,375,000
Coal and coke ...	254,000	284,000	- 30,000	11,369,000	12,012,000	- 643,000
Goods-train traffic ...	569,000	690,000	- 121,000	26,557,000	28,575,000	- 2,018,000
Total receipts ...	839,000	971,000	- 132,000	42,691,000	44,812,000	- 2,121,000
G.W.R. (3,737 mls.)						
Passenger-train traffic...	176,000	180,000	- 4,000	10,481,000	10,557,000	- 76,000
Merchandise, &c. ...	194,000	211,000	- 17,000	8,943,000	9,688,000	- 745,000
Coal and coke ...	110,000	130,000	- 20,000	5,160,000	5,424,000	- 264,000
Goods-train traffic ...	304,000	341,000	- 37,000	14,103,000	15,112,000	- 1,009,000
Total receipts ...	480,000	521,000	- 41,000	24,584,000	25,669,000	- 1,085,000
S.R. (2,140 mls.)						
Passenger-train traffic...	253,000	252,000	+ 1,000	15,614,000	15,633,000	- 19,000
Merchandise, &c. ...	60,000	65,000	- 5,000	2,926,000	3,069,500	- 143,500
Coal and coke ...	36,000	40,000	- 4,000	1,464,000	1,478,500	- 14,500
Goods-train traffic ...	96,000	105,000	- 9,000	4,390,000	4,548,000	- 158,000
Total receipts ...	349,000	357,000	- 8,000	20,004,000	20,181,000	- 177,000
Liverpool Overhead ...	1,248	1,319	- 71	64,873	62,489	+ 2,384
Mersey (4½ mls.) ...	4,584	4,419	+ 165	211,271	202,606	+ 8,665
*London Passenger Transport Board ...	573,100	555,300	+ 17,800	13,040,200	12,902,800	+ 137,400
<b>IRELAND</b>						
Belfast & C.D. pass. (80 mls.)	1,569	1,622	- 53	118,678	122,573	- 3,895
" " goods	426	541	- 115	21,076	23,545	- 2,469
" " total	1,995	2,163	- 168	139,754	146,118	- 6,364
Great Northern (543 mls.) pass.	8,100	8,050	+ 50	529,750	532,150	- 2,400
" " goods	11,550	10,000	+ 1,550	446,200	458,550	- 12,350
" " total	19,650	18,050	+ 1,600	975,950	990,700	- 14,750
Great Southern (2,076 mls.) pass.	29,024	27,801	+ 1,223	1,756,440	1,751,041	+ 5,399
" " goods	55,821	58,129	- 2,308	2,002,020	2,064,980	- 62,960
" " total	84,845	85,930	- 1,085	3,758,460	3,816,021	- 56,561

\* 23rd week (before pooling)

\* ex dividend



## CONTRACTS AND TENDERS

Robert Stephenson & Hawthorns Limited is building five diesel mechanical locomotives for the Air Ministry. The oil engines are to develop 150 b.h.p. at 1,000 r.p.m., and Vulcan-Sinclair fluid couplings are to be fitted.

Prestige & Co. has received the contract from the London Passenger Transport Board for building a new station at East Finchley, which will become part of the Underground system when, in conjunction with the L.N.E.R., the Northern Line is extended from Finsbury Park, via Highgate and Finchley Central (now Church End) to High Barnet, and to the existing terminus of the Northern Line at Edgware. The existing L.N.E.R. station at East Finchley will be demolished and new booking halls will be built on each side of the tracks—one on the south-west side looking on to New Road, the other on the north-east side looking on to High Street (the Great North Road). A new track, to be used by the tube trains which run to the West End via Archway and Camden Town will be built on the outside of each of the platforms. The bridge which carries the existing tracks over the Great North Road just south of the platforms will be renewed, and two new bridges, on which work has begun, will be built on either side of it to carry the new tracks. The architects for the new station are Messrs. Adams, Holden & Pearson.

### G.W.R. Contracts Placed

The Directors of the Great Western Railway have authorised the placing of the following contracts:—

Henry Bolton & Co. Ltd.: Reconstruction and widening of Cordley Street Bridge, Swan Village, Staffs.

E. A. Foulks Limited: Supply, delivery, and erection of two electric 30-cwt. goods lifts in inwards shed at Hockley goods station; and of two 30-cwt. luggage lifts at Acton station.

Walker Brothers (Wigan) Limited: Reconditioning of ventilating fan engine at Severn Tunnel Pumping Station.

Dawnays Limited: Supply of steel girders for roof over new loading bank at Penzance.

R. Pratt Limited: Supply of eight Fordson Sussex chassis and three Fordson 3-ton trucks.

Latil Industrial Vehicles Limited: Supply of one "Latil Mark I" tractor and two "Latil Mark I" tractors with winch, land anchor, and six-speed gearbox.

Herbert Morris Limited: Supply and erection of four electric 1-ton runways at Brentford Dock depot.

Crane & Hoist Company: Supply and erection of 1-ton runway at Cirencester goods shed.

### New Locomotives for the L.N.E.R.

During 1939 the L.N.E.R. is proposing to break up 158 locomotives of various types, which are no longer serviceable. It is considered that there is scope for reducing the total stock by limiting the new building programme to engines of one type. It has accordingly been decided to construct 50 tender engines of the 2-6-2 type, "V2" or "Green Arrow" class, capable of dealing with fast freight and passenger trains, together with 10 tank engines of the "V" class 2-6-2T type for heavy and

smartly timed local passenger services principally in Scotland and on the North-East Coast.

The Chinese Government Purchasing Commission on behalf of the Ministry of Communications has placed the following orders for equipment for the Hunan-Kwangsi Railway, to be supplied to the inspection of Messrs. Fox & Mayo:—

Wm. Hunt & Sons (The Brades) Ltd.: 5,000 shovels.

English Tools Limited: 3,000 picks.

Hardypick Limited: Sledge hammers and claw bars.

Eagle & Globe Steel Co. Ltd.: Tool steel.

Wm. Beardmore & Co. Ltd. has received an order from the Madras & Southern Mahratta Railway, to the inspection of Messrs. Rendel, Palmer & Tritton for the supply of 10 locomotive crank axles.

### New Rolling Stock for Argentine State Railways

A Decree issued by the Ministry of Public Works authorises the State Railways Administration to call for tenders for 900 covered goods wagons at a cost of 6,300,000 pesos paper. It is stated that this additional rolling stock, which represents the largest purchase of this class of material for some considerable time, has been rendered necessary by the increased goods traffic, due to industrial development. Existing rolling stock is also inadequate for new branches recently opened, shippers requirements being frequently in excess of the numbers of wagons available.

The Yugoslav State Railways Administration is considering tenders for ten narrow-gauge steam locomotives and tenders.

Tenders have been invited by the Yugoslav State Railways for the construction of a standard-gauge railway between Banja Luka and Cacak. There are already certain narrow-gauge lines along part of the route.

The Iranian State Railways Administration is enquiring for six four-car diesel passenger trains of compartment stock. Tenders have to be in about the middle of January.

Tenders are invited by the Government of India, Railway Board, receivable in the Office of the Director, Mechanical Engineering, Railway Board, New Delhi, by January 3, for the supply of a total of 935 wagons without wheels and axles required for the Indian Railways, for delivery between April 1, 1939, and March 31, 1940:—

#### Broad Gauge

Five all-steel motor vans  
33 "BVG" type goods brake vans  
60 "TO" type oil tank wagons  
Six "TP" type petrol tank wagons  
220 "OM" type open wagons  
Three "CE" type explosives wagons  
500 "CR" type covered wagons  
100 "BR" type rail wagons

#### Metre Gauge

Two "MBR" type rail wagons  
Six "MBVG" type goods brake vans

Of the £10,000,000 credit accorded by Great Britain to Turkey, £1,500,000 will be set aside for the purchase in the United Kingdom of 41 locomotives and some 200 goods vans, states the Istanbul correspondent of *The Times*.

The L.N.E.R. is arranging to paint the exterior of eight of its hotels during 1939. The hotels concerned are: Great Eastern Hotel, Liverpool Street Station; Great Eastern Hotel, Parkeston Quay; Royal Victoria Station Hotel, Sheffield; Great Northern Victoria Hotel, Bradford; Sandringham Hotel, Hunstanton; Yarborough Hotel, Grimsby Town; Royal Station Hotel, Newcastle; and Zetland Hotel, Saltburn-by-the-Sea.

## Forthcoming Events

- Dec. 10 (Sat.).—Permanent Way Institution (Manchester-Liverpool), at Staff Dining Room, L.M.S.R., Hunts Bank, Manchester, 3 p.m. "Permanent Way Problems and Modern Transport," by Mr. F. Lawson.  
Stephenson Locomotive Society (London) at King's Cross Station, L.N.E.R., 2.30 p.m. Annual General Meeting.  
Annual Dinner, at London School of Economics, Houghton Street, W.C.2, 6.30 p.m.  
Dec. 12 (Mon.).—Institute of Transport (London), at Inst. of Electrical Engineers, Savoy Place, W.C.2, 5.30 p.m. Annual General Meeting. "Acceleration of Railway Services," by Mr. S. Fisher.  
Dec. 13 (Tues.).—Institute of Transport (Birmingham), at Queen's Hotel, 6 p.m. "Coal Conveyance—Some Thoughts on the Commercial Aspect," by Mr. E. Woodhouse.  
Institution of Automobile Engineers (Luton), at George Hotel, 7.30 p.m. "Tyre Requirements for Modern Transport," by Mr. C. Law.  
Institution of Civil Engineers (Newcastle), at Inst. of Mining, Westgate Road, 7.30 p.m. "Adjustment of Railway Curves," by Mr. C. MacNicol.  
Permanent Way Institution (Brighton), at Mess Room, New England Street, 7 p.m. "Re-Railing and Renewals of Tracks in Tunnels with 180-ft. Rails," by Mr. S. Dugay.  
Permanent Way Institution (Sheffield), at Royal Victoria Hotel, 7 p.m. "Oxy-Acetylene Welding as Applied to Track Work," by Mr. R. Doré.  
Permanent Way Institution (York), at Railway Inst., Queen Street, 6.30 p.m. "Rail Joints," by Mr. W. White.  
Dec. 14 (Wed.).—Diesel Engine Users Association, at Caxton Hall, Caxton Street, London, S.W.1, 4.45 p.m. Symposium on the Starting of Diesel Engines.  
Institute of Transport (Scottish), at St. Enoch Hotel, Glasgow, 7.15 p.m. "Transport in Relation to the Agricultural and Fishing Industries," by Mr. K. Fenelon.  
Institution of Locomotive Engineers (London), at Inst. of Mechanical Engineers, Storey's Gate, S.W.1, 6 p.m. "Wear Resistance of Ferrous Material," by Messrs. W. West and C. Hodgson.  
Royal Society of Arts, John Street, London, W.C.2, 8.15 p.m. "Trade Associations," by Mr. W. Tudor Davies.  
Dec. 15 (Thurs.).—Lecture and Debating Society, in General Meeting Room, Paddington Station, 5.45 p.m. "Catering by Land and Sea," by Mr. R. Setterfield.  
Institution of Civil Engineers (Yorkshire), at Hotel Metropole, Leeds, 7.30 p.m. "The Ballasting for Railway Track," by Mr. F. Pawley.  
Institution of Locomotive Engineers (Scottish), at Royal Technical College, George Street, Glasgow, 7.30 p.m. General Meeting.  
Dec. 16 (Fri.).—Institute of Transport (East Midlands), at Guildhall, Nottingham, 7 p.m. "Public Service Vehicle Body Construction," by Mr. W. Hickman.  
Institute of Transport (Manchester-Liverpool), at Queen's Hotel, Piccadilly, Manchester, 6.30 p.m. "Can Unnecessary Transport be Eliminated?" by Mr. W. McLaren Hamilton.

## PARLIAMENTARY NOTICES

IN PARLIAMENT.

Session 1938-39.

## Southern Railway

**NOTICE IS HEREBY GIVEN** that application has been made to Parliament in the present Session by the Southern Railway Company for an Act under the above name or short title intituled "A Bill to empower the Southern Railway Company to construct works and to acquire lands; to extend the time for the completion of a railway and the compulsory purchase of certain lands; to confer further powers on the Company; and for other purposes."

A Notice containing a concise summary of the purposes of the intended Act has been or will be published in *The Times* newspaper of the 1st and 8th December, 1938.

A printed copy of the Bill for the intended Act may be inspected and copies thereof obtained at a price not exceeding five shillings for each copy, at the offices of the undermentioned Solicitor and Parliamentary Agents and at the Station-master's Office at the following railway stations of the Company, *viz.*, Winchester, Maidstone West and Guildford.

**AND NOTICE IS HEREBY ALSO GIVEN** that on or before the 19th day of November, 1938, plans and sections relating to the said intended works and plans of all lands which may be taken or used compulsorily with a book of reference to such plans were deposited for public inspection as follows (that is to say):—

As regards works and lands in the County of London with the Clerk of the County Council of that County at his office at the County Hall, Westminster Bridge, S.E.1; as regards works and lands in the County of Southampton

with the Clerk of the County Council of that County at his office at Winchester; as regards works and lands in the County of Kent with the Clerk of the County Council of that County at his office at Maidstone, and as regards works and lands in the County of Surrey with the Clerk of the County Council of that County at his office at Kingston-upon-Thames.

And that copies of so much of the said plans sections and book of reference as relates to each of the several areas herein-after mentioned in or through which the said intended works are proposed to be made or lands are situate were on or before the said 19th day of November, 1938, deposited for public inspection as follows (that is to say):—

As relates to the City of London with the Town Clerk of that City at his office; as relates to any borough with the Town Clerk of that borough at his office; as relates to any urban district (not being a borough) or to any rural district with the Clerk of the district council of such district at his office; as relates to any parish comprised in a rural district having a parish council with the Clerk of the council of such parish at his residence, and as relates to the parish of Addington with the Chairman of the parish meeting of such parish at his residence.

Dated this 5th day of December, 1938.

H. L. SMEDLEY,  
Waterloo Station,  
London, S.E.1.  
Solicitor.

SHERWOOD & Co.,  
Clarence House,  
4, Central Buildings,  
Westminster, S.W.1.  
Parliamentary Agents.

IN PARLIAMENT.

Session 1938-39.

London & North Eastern Railway  
(Superannuation Fund)

**NOTICE IS HEREBY GIVEN** that application has been made to Parliament in the present Session by the London & North Eastern Railway Company for an Act under the above name or short title intituled "A Bill to establish a Superannuation Fund for certain of the staff of the London & North Eastern Railway Company; to provide that payments thereout shall not be assignable or chargeable; to provide for winding up the affairs of Thompson McKay & Company Limited; and for other purposes."

A printed copy of the Bill for the intended Act may be inspected and copies thereof obtained at the price of four shillings for each copy at the undermentioned offices and at the offices of the Company's Solicitor (Scotland), 23, Waterloo Place, Edinburgh.

Dated this 5th day of December, 1938.

I. BUCHANAN PRITCHARD,  
King's Cross Station, N.1.  
Chief Legal Adviser.

W. R. MOLE,  
4, Cowley Street,  
Westminster, S.W.1.  
Assistant Solicitor.

SHERWOOD & Co.,  
Clarence House,  
4, Central Buildings,  
Westminster, S.W.1.  
Parliamentary Agents.

## LEGAL AND OFFICIAL NOTICES

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## Crown Agents for the Colonies

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APPOINTMENTS.

**APPLICATIONS** from qualified candidates are invited for the following post:—  
**ASSISTANT MECHANICAL OFFICER** required for the Nigerian Government Railway for two tours each of 12-24 months, with possible permanency. Salary £475 a year rising to £840 a year. Free passages and quarters and liberal leave on full salary. Candidates, aged 25-35, must possess an Engineering degree or be Associate Members of the Institution of Mechanical Engineers. They must have served a full apprenticeship with a British Railway or Locomotive firm and subsequently have had experience in the organisation and administration of a locomotive workshop. An elementary knowledge of Costing System as applied to Workshops would be advantageous. Preference will be given to a candidate having had some running experience.

Apply at once by letter, stating age, whether married or single, and full particulars of qualifications and experience, and mentioning this paper, to the CROWN AGENTS FOR THE COLONIES, 4, Millbank, London, S.W.1, quoting M/8129.

**THE MADRAS & SOUTHERN MAHRATTA RAILWAY COMPANY LIMITED** invite Tenders for:—

242 STEEL TYRES FOR LOCOMOTIVES—  
BROAD GAUGE.

Specification and Form of Tender can be obtained at the Company's Offices, 123, Victoria Street, Westminster, London, S.W.1.

Fee ONE GUINEA, which will not be returned.

Tenders must be submitted not later than 2.00 p.m. on TUESDAY, 3RD JANUARY, 1939.

The Directors do not bind themselves to accept the lowest or any Tender and reserve to themselves the right of reducing or dividing the order.

By Order of the Board.

V. CRASTER,

Secretary.

## ASSISTANT ENGINEER.

**REQUIRED** for the Iraqi State Railway for three years. Salary Iraq Dinars 70 a month (I.D.1 equals £1). Free passages and liberal leave on full salary. The post is not pensionable but there is a Provident Fund Scheme. Candidates, not over 40 years of age, must be Associate Members of the Institution of Civil Engineers or hold an engineering degree recognised as granting exemption from Sections A and B of the A.M.I.C.E. examination; have had practical experience on a Railway.

Apply at once by letter, stating age, whether married or single, and full particulars of qualifications and experience, and mentioning this paper, to the CROWN AGENTS FOR THE COLONIES, 4, Millbank, London, S.W.1, quoting M/5904.

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## OFFICIAL ADVERTISEMENTS

**OFFICIAL ADVERTISEMENTS** intended for insertion on this page should be sent in as early in the week as possible. The latest time for receiving official advertisements for this page for the current week's issue is noon on Thursday. All advertisements should be addressed to:—*The Railway Gazette*, 33, Tothill Street, Westminster, London, S.W.1.

## Railway Share Market

Holiday influences are already affecting business in the stock and share markets and, despite the commencement of the new Stock Exchange account on Monday, there had been a further decline of activity in all sections of the market. Consequently, a general trend to lower values has been shown, although buyers were more in evidence subsequently, and rather firmer conditions appeared to be developing.

Home railway securities reflected the surrounding trend of markets and the lower prices failed to attract attention, partly owing to the heavy decline in traffics shown by the past week's figures, and partly because there is a widespread tendency to await further developments in the railways' "square deal" claims. Various of the guaranteed stocks declined sharply, and debentures were rather lower in some instances, although this was due partly to the fact that they are ex-interest payments in some instances. With the possible exception of L.N.E.R. second guaranteed, all the guaranteed stocks are, of course, expected to receive their full

interest payments, and there seems little doubt that they have declined to unduly low levels under the influence of prevailing sentiment in regard to railway securities. Moreover, several of the debentures would also seem to offer quite attractive yields, bearing in mind their first class investment merits. The decline in Government securities affected the trend in fixed interest-bearing issues generally this week, but it is perhaps doubtful if there will be a sustained recovery in railway prior charge stocks until market conditions are more buoyant and there is a check to the heavy fall in weekly traffic receipts.

Great Western ordinary transferred around 27½, while the 5 per cent. preference has been lowered to 78, and the 5 per cent. guaranteed receded to 105. Little attention was given to L.N.E.R. first and second preference stocks at 22½ and 9½, and the first and second guarantees have moved down to 69½ and 54½ respectively. The 3 per cent. debentures were 64½ and the 4 per cent. debentures 86½. L.M.S.R. ordinary changed

hands around 12 and the 4 per cent. and 1923 preference stocks at 45 and 25 respectively, while the 4 per cent. guaranteed was 79½. Southern deferred declined to 12½ and the preferred to 57½; the 5 per cent. guaranteed was 114 and the 5 per cent. preference 91. London Transport "C" was unable to resist the general market trend and made the lower price of 77.

Foreign railway stocks were neglected, although the tendency in those of the leading Argentine companies was relatively steady on expectations that before long traffic figures will improve. The crop position in Argentina appears to be very good and before long a strong upward movement in the receipts of the Central Argentine and B.A. Gt. Southern seems probable. Central Argentine 4½ per cent. preference has, however, gone back to 28 and B.A. Gt. Southern 5 per cent. preference to 42. Elsewhere San Paulo ordinary fell to 33. French railway sterling bonds improved, and towards the middle of the week American railway shares made better prices.

### Traffic Table of Overseas and Foreign Railways Publishing Weekly Returns

Railways	Miles open 1937-38	Week Ending	Traffics for Week		No. of Weeks	Aggregate Traffics to Date			Shares or Stock	Prices						
			Total this year	Inc. or Dec. compared with 1937		Totals		Increase or Decrease		Highest 1937	Lowest 1937	Dec. 7, 1938	Yield % (See Note)			
						This Year	Last Year									
South & Central America	Antofagasta (Chili) & Bolivia	834	4.12.38	15,650	-	£ 3,719	49	721,790	818,540	-	96,750	Ord. Stk.	29	101½	9	Nil
	Argentine North Eastern	753	3.12.38	9,169	-	211	23	238,120	223,340	+	14,780	A. Deb.	1914	6	51½	58½
	Argentine Transandine	174	Oct., 1938	3,550	-	150	44	37,200	53,050	-	15,850	6 p.c. Deb.	9312	5	81½	91½
	Bolivar	2,806	3.12.38	85,670	+	6,079	23	1,642,249	1,799,319	-	157,070	Bonds	1718	51½	41½	Nil
	Brazil	190	19.11.38	\$105,800	+	\$11,700	21	\$2,481,700	\$2,868,900	-	\$387,200	Mt. Deb.	412	18	16	Nil
	Buenos Ayres & Pacific	5,084	3.12.38	142,308	+	11,353	23	2,787,345	2,807,134	-	19,789	Ord. Stk.	3334	131½	101½	Nil
	Buenos Ayres Central	1,930	3.12.38	42,432	+	745	23	906,762	1,041,626	-	134,864	"	3145	114	10	Nil
	Buenos Ayres Gt. Southern	3,700	3.12.38	108,676	-	7,103	23	2,312,730	2,898,015	-	585,285	"	3414	103½	10	Nil
	Buenos Ayres Western	972	26.11.38	18,408	-	948	22	376,560	354,065	+	22,495	Dfd.	2012	41½	31½	Nil
	Central Argentine	1,218	Oct., 1938	19,893	-	2,687	18	94,876	101,026	-	6,150	Ord. Stk.	6732	2	2	Nil
	Do.	188	Oct., 1938	15,800	+	1,100	44	163,800	154,300	+	9,500	Ord. Inc.	614	11½	3	Nil
	Cent. Uruguay of M. Video	70	Oct., 1938	15,204	+	1,631	23	351,163	307,112	+	44,051	1 Mt. Db.	107	106	105	51½
	Cordoba Central	810	3.12.38	14,300	+	1,600	49	365,500	391,600	-	26,100	Ord. Sh.	19716	6	6	Nil
	Costa Rica	1,092	3.12.38	\$390,826	-	\$49,094	44	\$4,580,780	\$4,780,933	-	\$200,153	"	54	1	14	Nil
	Dorad	794	Oct., 1938	3,995	-	870	48	57,105	56,685	+	420	1st Pref.	2/-	18	12	Nil
	Entre Rios	22½	Nov., 1938	28,432	+	7,231	49	1,040,250	1,126,915	-	86,665	Stk.	812	6	71½	Nil
	Great Western of Brazil	1,918	3.12.38	\$354,000	-	\$97,000	22	\$5,746,500	\$6,449,810	-	\$703,300	Ord. Stk.	914	3	2	Nil
	International of Cl. Amer.	483	30.11.38	9,090	+	181	18	34,073	33,065	+	1,008	"	112	14	11	Nil
	Interoceanic of Mexico	319	Oct., 1938	5,892	+	2,041	48	132,806	139,513	-	6,707	"	178	12	12	Nil
	La Guaira & Caracas	386	30.11.38	\$3,737,000	+	\$328,000	23	\$68,083,000	\$73,911,000	-	\$5,828,000	Ord. Sh.	3116	2	154	51½
Leopoldina	274	3.12.38	62,331	-	16,486	22	340,673	427,128	-	85,455	Pr. Li. Stk.	84	7914	5712	Nil	
Mexican	1,059	Nov., 1938	\$23,400	+	\$9,999	22	\$252,504	\$271,595	-	\$9,031	Pref.	1454	412	234	Nil	
Midland of Uruguay	153½	27.11.38	28,300	-	7,857	48	1,469,757	1,540,689	-	70,932	Pr. Li. Db.	2312	212	191½	Nil	
Nitrato	160	Oct., 1938	3,885	+	1,070	18	11,785	12,885	-	1,100	Ord. Stk.	9812	56	32	12½	
Paraguay Central	1,353	3.12.38	12,890	-	1,780	23	355,204	375,795	-	20,591	Ord. Sh.	5716	1116	58	16	
Peruvian Corporation	73	Oct., 1938	1,119	+	157	18	3,900	3,382	+	518	Ord. Stk.	10	2	2	Nil	
Salvador	23,721	30.11.38	1,022,244	+	3,717	48	33,411,534	36,435,436	-	3,023,902	Deb. Stk.	77	6212	69126	51½	
San Paulo	17,185	30.11.38	807,400	+	14,000	48	26,062,200	26,534,600	-	502,400	"	10173	9412	101126	51½	
Taltal	1,329	10.11.38	50,640	+	4,931	30	891,187	829,318	+	61,869	4 p.c. Gar.	18	734	6	Nil	
United of Havana	202	20.11.38	2,752	-	5,453	32	93,187	84,517	+	8,670	Ord. Stk.	317	80	871½	716	
Uruguay Northern	2,108	20.11.38	72,161	-	14,664	8	368,052	372,225	-	4,173	Ord. Stk.	100	301	284	6916	
Canada	Canadian National	161	20.11.38	4,951	-	35	32	98,228	96,495	+	1,733	"	317	84	871½	716
	Canadian Northern	3,268	10.11.38	191,100	+	14,085	30	4,136,242	4,191,064	-	54,822	"	101	89	93126	516
	Grand Trunk	3,085	30.11.38	236,550	-	11,325	34	5,671,050	5,757,900	-	86,850	"	113	11012	107154	4816
	Canadian Pacific	2,967	20.11.38	151,575	+	18,318	32	3,481,983	3,290,762	+	191,221	"	110	105	10312	816
	Assam Bengal	571	20.11.38	12,164	-	280	8	61,762	60,638	+	1,124	"	314	300	287	616
	Barsi Light	2,531½	10.11.38	99,693	+	2,465	30	2,533,284	2,558,394	-	25,110	"	10312	9912	10212	48½
	Bengal & North Western	204	Sept., 1938	83,497	-	14,556	52	1,037,185	975,721	+	61,464	"	10312	9912	10212	48½
India	Bengal Doonars & Extension	620	20.11.38	7,252	-	33	32	143,212	153,759	-	10,547	Pr. Sh.	31/-	34	12	Nil
	Bengal Nagpur	1,625	Aug., 1938	182,150	-	14,527	35	1,860,357	1,920,155	-	59,798	B. Deb.	4818	4312	47	7116
	Bombay, Baroda & Cl. India	277	Oct., 1938	17,170	+	421	18	61,856	54,675	+	7,181	Inc. Deb.	98	9312	90	4716
	Madras & Southern Mahratta	1,900	22.10.38	28,677	-	8,367	30	887,558	1,382,672	-	495,114	"	—	—	—	—
	Rohilkund & Kumaon	2,442	Sept., 1938	410,764	-	21,548	52	4,950,384	4,635,398	+	314,986	"	—	—	—	—
	South Indian	13,285	19.11.38	621,545	-	53,442	34	20,707,572	21,502,973	-	795,301	"	—	—	—	—
	Beira-Umtali	4,774	Aug., 1938	762,993	+	61,343	9	1,479,248	1,421,092	+	58,156	"	—	—	—	—
Various	Egyptian Delta	204	Sept., 1938	83,497	-	14,556	52	1,037,185	975,721	+	61,464	"	—	—	—	—
	Kenya & Uganda	620	20.11.38	7,252	-	33	32	143,212	153,759	-	10,547	"	—	—	—	—
	Manila	1,625	Aug., 1938	182,150	-	14,527	35	1,860,357	1,920,155	-	59,798	"	—	—	—	—
	Midland of W. Australia	277	Oct., 1938	17,170	+	421	18	61,856	54,675	+	7,181	"	—	—	—	—
	Nigerian	1,900	22.10.38	28,677	-	8,367	30	887,558	1,382,672	-	495,114	"	—	—	—	—
	Rhodesia	2,442	Sept., 1938	410,764	-	21,548	52	4,950,384	4,635,398	+	314,986	"	—	—	—	—
	South Africa	13,285	19.11.38	621,545	-	53,442	34	20,707,572	21,502,973	-	795,301	"	—	—	—	—
Victoria	4,774	Aug., 1938	762,993	+	61,343	9	1,479,248	1,421,092	+	58,156	"	—	—	—	—	

NOTE.—Yields are based on the approximate current prices and are within a fraction of 1½

† Receipts are calculated @ 1s. 6d. to the rupee

§ ex dividend

The variation in Sterling value of the Argentine paper peso has lately been so great that the method of converting the Sterling weekly receipts at the par rate of exchange has proved misleading, the amount being overestimated. The statements are based on the current rates of exchange and not on the par value



# Electric Railway Traction

## Rail Bonding

IN the development of welded bonds for track and conductor rails many difficulties have had to be overcome, one of the earliest of which was the tendency of the welding heat to soften the rail end. Another arose with the practices of heat-treating rail ends *in situ* as a preventive of battering, and building up battered rail ends by welding, both of which affected the bond. According to the 1938 report of a sub-committee of the Electrical Section of the Association of American Railroads, it has been found in certain instances that welded, brazed, or mechanically-applied bonds may be protected successfully by plastic heat insulation when the process of rail-end hardening consists of the rapid heating of the rail head surface for 15 to 20 sec. by a high temperature flame and then allowing it to cool in still air. In other hardening processes, where pre-heating and quenching are involved, or where the pre-heating is carried out by electric induction, the bonds cannot be protected, and have to be removed. In most of the welding processes used to build up rail ends the temperature of the rails becomes high enough to necessitate removing the bonds and re-applying them after the building up is completed.

## Italian Electrification

A FURTHER definite stage in the electrification of the whole main-line system of the Italian State Railways has been brought to completion with the inauguration of d.c. electric traction on the Milan—Ancona and Rome—Liguria routes on November 14. The State Railways now have approximately 1,850 route miles of line electrified on the 3,000-volt d.c. system, 50 miles on low-tension d.c. systems, and 1,080 miles on the three-phase 16 $\frac{2}{3}$ -cycle 3,700-volt system, the electrified route length of 2,980 miles representing 28 per cent. of the total length and carrying all the heaviest and fastest traffic except that between Turin, Milan, and Venice. The experimental three-phase 45-cycle 10,000-volt system has disappeared, and the line over which it was in operation, Rome to Sulmona, is now worked on the 3,000-volt d.c. principle. Although it will be some time before the next big extension of d.c. traction is finished, there are numerous stray ends and connecting lines in process of conversion, either from steam working to d.c. or from a.c. to d.c., in order to improve traffic operation and increase the motive power and rolling stock user. The increase in the rate of conversion has been very marked during the last five years, the approximate electrified route mileage rising from 914 km. in 1926 to 1,550 km. in 1928, to 1,972 km. in 1932, to 2,120 km. in 1934, to 3,870 km. in 1936, and over 4,800 km. at the end of 1938. But the incidence of three-phase and d.c. systems adjacent to one another leads to complication at interchange points, and one

curious result is that in order to take advantage of the high speeds which the d.c. three-car streamlined trains can maintain over sinuous and hilly routes not laid with the heaviest rails, it is proposed that a fast service between Rome and Turin should involve a change at Viareggio, passengers detraining there from the three-car set (in the northbound direction) and transferring to a train of ordinary stock hauled by a three-phase locomotive. The remaining services are locomotive-hauled throughout. Out of Milan, as a result of the transference of certain trains to the Centrale station from the Porto Nuovo, high-tension d.c. locomotives may sometimes be seen hauling low-voltage d.c. multiple-unit trains as far as Gallarate or Varese, where the sets resort to their own third rail operation for the run thence to Porto Ceresio. The greater part of the energy required for the railways is generated in hydro-electric stations, some of which were built specially for traction purposes and others for industrial use. Similarly, the early e.h.t. transmission lines were built by the railways, but for the recent extensions the transmission lines are to form one of the nuclei of the Italian grid. Of the power stations in the Apennines, those at Suviana, Castrola, and Riola are operated in series, the water passing through each in turn before being discharged into the River Reno. A number of hydro-electric stations have been built in recent years in the Isonzo and Piave valleys, and a new sub-surface plant on the Isonzo is due to be opened at the end of the year. Increasing use is being made of the Breda three-car streamlined electric trains (see issues of this Supplement for July 23 and August 20, 1937), eight of which are now in service. The ninth train is to be sent to the New York World Fair in 1939, and another five are on order. There are 100 seats in the new trains compared with 94 in the first six, and the interior arrangement and air conditioning have been materially altered. Single-unit motorcoaches of streamlined contour built by Fiat and Breda are also used in large numbers. Most of the new locomotive construction has been concentrated on the express passenger locomotives of the E.428 class with the 2-Bo + Bo-2 wheel arrangement and on the Bo+Bo+Bo E.626 class, which operates both freight trains and miscellaneous passenger trains. Indeed, in the Julian Alps area all locomotive-hauled trains are headed by the 96-ton E.626 units, which have a one-hour rating of 2,800 h.p. at 40 km.p.h. (25 m.p.h.). The 128-ton E.428 class have four double-armature motors with an aggregate output on the one-hour rating of 3,750 h.p. at 90 km.p.h. (56 m.p.h.). No appreciable increase has been recorded in the electrification of Italian private railways within recent years, and some, such as the Nord Milano, have been taken over by the State. Nevertheless, there are almost 1,000 miles of electrified route, and the systems in use include high-tension and low-tension d.c., single-phase, and three-phase.

## Single-Phase Electric Train Sets in Switzerland

### Extension of motorcoach, multiple-unit, and trailer working on the Lötschberg lines

BY the introduction of three new lightweight twin-car electric trains the Berner Alpenbahn Gesellschaft has put a coping stone to its policy of using fast motorcoaches for a variety of services, a method which has been pursued with single-unit cars during the last two or three years. Two of the new trains are for operation on the Berne—Neuchatel line and the third is for the Berne—Lötschberg—Simplon route, both of which are electrified on the Swiss standard single-phase 15-kV. 16⅔-cycle system.

The external appearance follows that of the earlier single-unit cars, with the lower half of the body painted dark blue and the upper part cream, but the general lines have been improved, both for the sake of appearance and to reduce somewhat the air resistance. The ends slope backwards and are continued harmoniously by the carefully curved construction of the roof. The entrance doors are practically level with the coach sides, and there are no outside handrails. The window levels are the same throughout the trains with the exception of the driving compartments. All these features combine with the low level of the coach sides to give the trains a smart appearance.

#### Electrical Equipment

Sécheron electrical equipment is installed, and includes on each coach of the set two traction motors driving the wheels through a form of individual axle drive, a transformer in the roof of the driving and luggage compartments, and mechanical-pneumatic control apparatus, the contactors of which give 22 power and 18 braking notches. Each wholly springborne motor has a one-hour rating of 230 h.p. at a rotational speed corresponding to a track speed of 76 km.p.h. (47.2 m.p.h.), and a continuous rating of 208 h.p. at 81 km.p.h. (50.3 m.p.h.). The corresponding total tractive efforts at the wheel rims are 3,260 and 2,780 kg. (7,200 and 6,125 lb.), and the starting value is 6,000 kg. (13,200 lb.). The wheels are 900 mm. (35½ in.) in diameter and are driven through

helical gears with a ratio of 3.5:1. The maximum permissible speed is 110 km.p.h. (68 m.p.h.). In order to devote the whole of the floor space to revenue-earning purposes, certain of the principal items of electrical equipment, e.g., the transformer, contactors, and braking resistances, are located in the roof, where, incidentally, they are very well ventilated. Other details, such as the motor-driven compressor and battery, are housed below floor level.

#### Mechanical Portion

The electrical equipment of a two-car set weighs 20 tonnes and the mechanical equipment 47½ tonnes, which, together with 0.5 tonnes supplies and tools gives an empty weight of 68 tonnes. With a full load of 139 seated and 41 standing passengers and the usual amount of luggage and mails, the gross weight is 85 tonnes. On the one-hour rating the set thus has 13½ h.p. per tonne of tare and 10½ h.p. per tonne of gross weight. The weight per passenger seat is 490 kg. (1,080 lb.).

The bodies and frames are of special light-steel integral construction, entirely welded. The flooring consists of plywood covered with linoleum, and having an intermediate layer of cork. All inside partitions, excepting those of the service compartments and at the inner ends of the coaches, have Sécurit glass. The windows of the driving compartments are frost-proof, having double panes with a heating element between them. The other windows, which are of plate-glass with Anticorodal frames, can be let down and are balanced. In the third class compartments the seats are upholstered in artificial leather, those in the second class in plush.

In addition to the passenger accommodation, in two classes, each with smoking and non-smoking open saloons, there are a luggage compartment (which in case of necessity can accommodate standing passengers, when the wire netting over the windows can be removed), and a postal compartment with space for parcels. There is one lavatory to each coach in a twin-car set. The entrance doors differ entirely from the usual type. They are folding doors, opening outwards, and are practically flush with the coach sides. The lower step is connected to the door and lifts up when the latter is closed. The doors are controlled from the driving compartments by compressed air through an electro valve, and all the doors on either

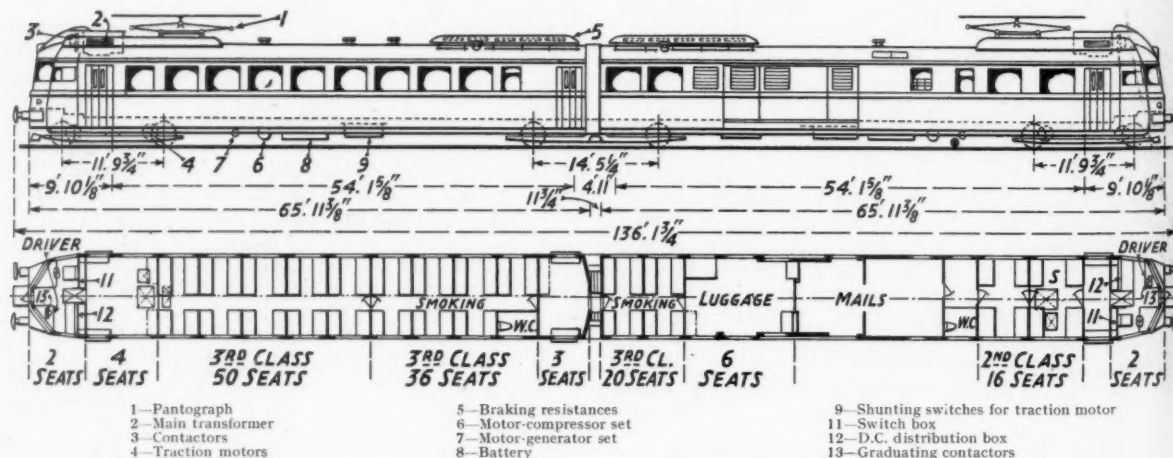
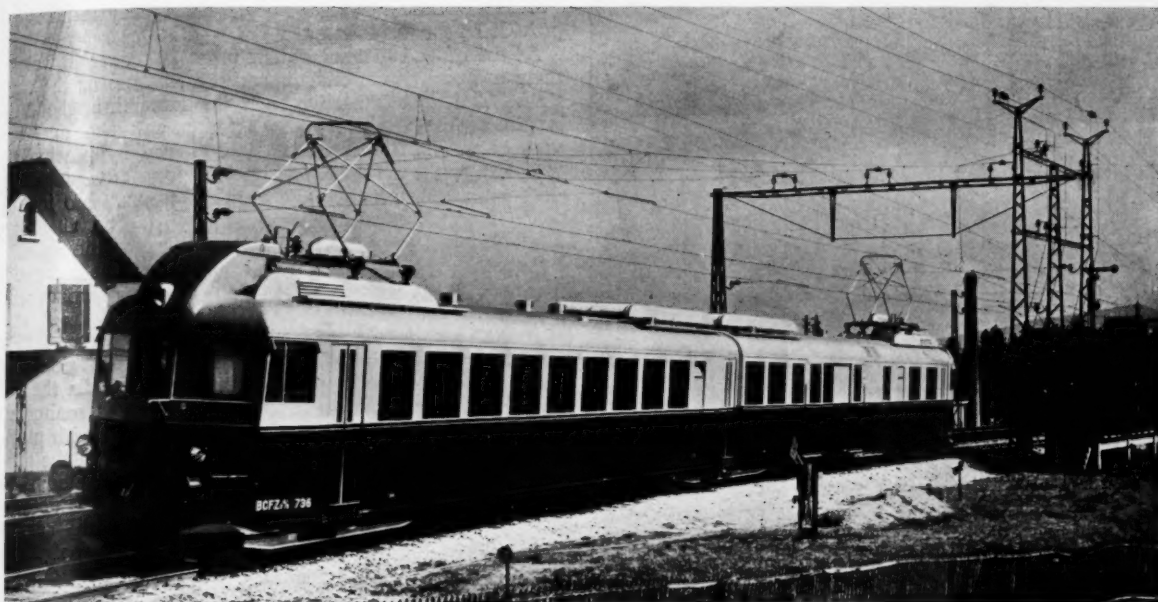
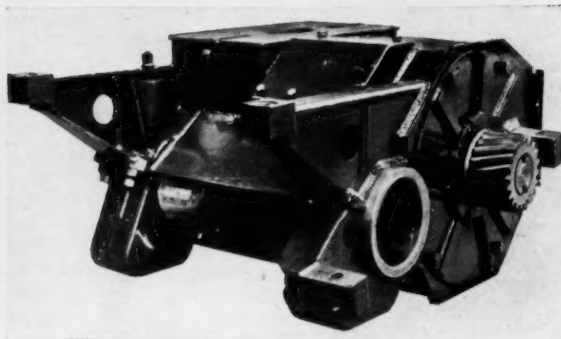
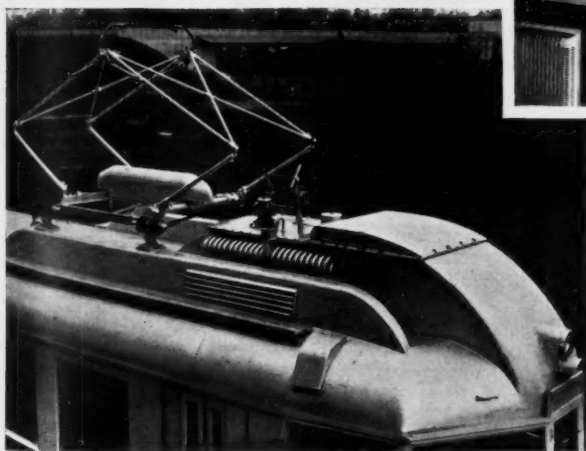
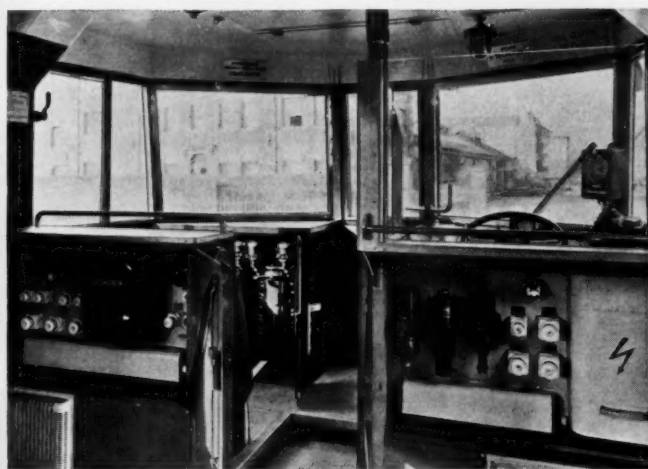


Diagram of Berner Alpenbahn twin-car single-phase electric trains



Above: General view of standard-gauge twin-car articulated 920-h.p. train



A—Third-class interior

B—Arrangement of end of roof showing pantograph and casing of transformer

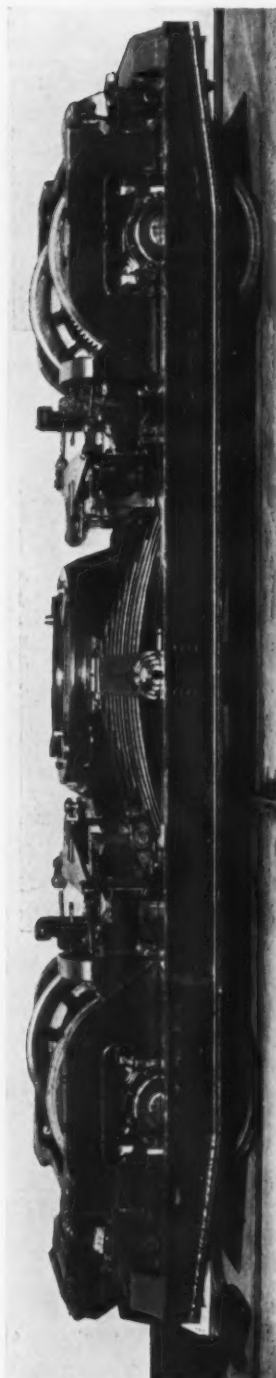
C—Driving compartment viewed from interior of car

D—S cheron 230-h.p. single-phase traction motor with welded steel frame

# EQUIPMENT OF THE L TSCHBERG LINE ELECTRIC TRAINS



Below : S.I.G. articulation non-motor bogie with guided axles on the S.I.G.-V.R.L. system, Lötschberg trains



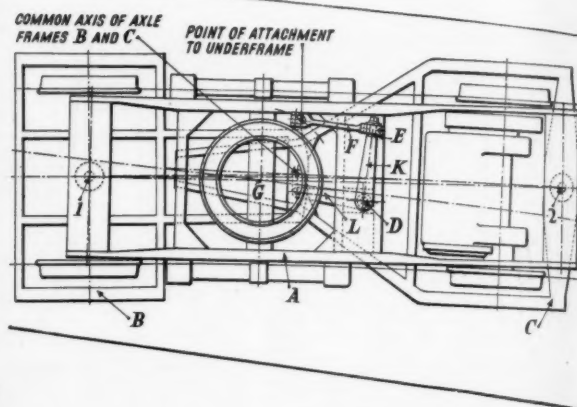
Above : Driving bogie with guided wheels on the S.I.G.-V.R.L. system



side are worked simultaneously. Emergency handles are provided near the doors.

As the trains can haul trailers up to 80 tonnes in weight, there are end doors, though only for the use of the train staff. The floor level, which is the same throughout the length of the train, is low, making entrance and exit very easy. This could only be achieved by placing the transformer on the roof, and the resulting advantages are very noticeable on these light-weight trains. No interior space is required for electric apparatus, and there are no high-tension cables through any part of the cars, as is the case for under-floor transformers. The relegation of the luggage-racks to the sides of the compartments further accentuates the roominess. The ceiling is of Pavatex, and is painted uniformly a light colour. The upper portion of the walls is panelled in birchwood, and the lower part covered with artificial leather. In the two second class compartments, the panelling is of mahogany and the spaces below the windows are covered with plush.

Non-rotating ceiling ventilators are provided in the third class compartments, while in the second class saloons the air is drawn by the traction motor ventilators. Ducts for this purpose connect the compartment with suction apparatus in the roofs, and the ducts from the roof to the



Diagrammatic plan of S.I.G.-V.R.L. bogie with guided axles on the Liechty principle

traction motors are constituted by the columns near the entrance doors which support the transformer. By drawing the cool air from the roof, introduction of track and brake shoe dust into the motors is effectively prevented. The space between the two cars is provided with a full-width rubber covering over the central gangway. Light metal is used for the doors of baggage and parcels compartments, the control tables, doors of switch cupboards, door frames, and the luggage racks in the second class compartments. Resistance heaters are fitted throughout the train, and are controlled by a thermostat in car No. 2 (third class). Normal hand control is provided in the other compartments and the driving positions.

### Bogies

Owing to the sinuous nature of many of the lines of the companies forming the Berner Alpenbahn Gesellschaft, very careful consideration had to be given to easy riding, particularly in view of the accelerated schedules contemplated. To that end the Liechty system of guided axles was adopted, and both the driving and articulated bogies are to S.I.G.-V.R.L. patents, the construction

embodying the inventions both of the Schweizerische Industrie Gesellschaft, the builder of the mechanical portion and of Mr. Liechty.

The main and swivelling frame structures of the bogies are of welded construction throughout. The axleboxes are of the roller type with underhung laminated springs, and the wheel and axle assemblies are of lightweight construction. The carrying axles are hollow-bored. The length of the trains makes it necessary for them to be divided during overhaul, and in previous sets it was the custom to support one coach body on jacks while the other was withdrawn. These operations have been markedly simplified by the adoption of the S.I.G. patent bogie, in which the bogie itself can be divided in the centre, so that each coach portion can be moved independently, as required, supported by wheels at each end.

In two-axle bogies of the Liechty (or S.I.G.-V.R.L.) type the car body rests on a large-diameter supporting ring on the bolster cradle frame. The cradle is supported on two journals having a common axis and housed in stirrups fixed to the middle of the main inverted laminated spring at each side. An even distribution of the load on the axles is thus assured. In articulated stock, two supporting rings are used, and the control arrangements are connected in each case to the underframe of the adjacent carriage, as may be seen from some of the accompanying illustrations.

Referring to the diagrammatic plan of a two axle non-articulation bogie, the two longitudinal inverted laminated springs are placed one on each side of the bogie frame, and rest on blocks fixed to the frame structure through the intermediary of rubber pads. The bogie frame structure *A* is connected to the independent wheel frames *B* and *C* by the pivotal bearings *J*<sub>1</sub> and *J*<sub>2</sub>. These two wheel frames extend to the centre of the bogie, where they are both connected to a mechanism which controls the radial movement of the wheels, with a view to making the axis of the wheels coincide with the radius of the curve.

In the bogie frame structure is a vertical pivot *D* carrying two levers *K* and *L*, which have a certain predetermined angle between them. Lever *L* is connected to the ends of the independent wheel frames *B* and *C*, whereas lever *K* is connected through the rod *F* to a definite point on the car underframe. The relation between the levers is such that a rotary movement of the underframe in relation to the centre line of the bogie frame structure—a relation which is proportionate to the radius of the curve—results in a definite lateral displacement at the common axis of the two independent axle frames, and thus in the radial adjustment of the wheels. Transverse movements of the body do not influence the arrangement; nor is the delay in the guiding action when entering or leaving curves more than negligible, particularly when transition curves are used.

## NOTES AND NEWS

**Soviet Express Electric Locomotive.**—It is reported that an improved version of the 2-Co-2 locomotives of the Pb class (see issue of this Supplement for April 30, 1937) has been evolved by the Soviet technical authorities, and that the safe maximum speed of the electrical equipment has been raised to 112 m.p.h. Production in 1939 is envisaged.

**112 m.p.h. in Switzerland.**—When making a special trip with a party of French railway engineers on October 22, one of the three-car 2,300-h.p., single-phase electric trains of the Swiss Federal Railways (described in the issue of this Supplement for December 10, 1937) attained a speed of 180 km.p.h. (112 m.p.h.) between Martigny and Riddes, on the Simplon route.

**Soviet Electrification.**—The Kandalaksha-Apatite-Kirov electrification, completed in 1936, has been extended from Imandra to Olenya, a distance of 23 miles, and it is now anticipated that the conversion of the remaining 70 miles from Olenya to Murmansk will be finished by the middle of 1939. The original plans visualised the electrification of the whole Kandalaksha-Murmansk route, 186 miles long, before 1937.

**Gotthard Locomotives.**—From the beginning of 1932, when they were first placed in traffic, up to the end of 1937, the two 8,000-h.p. electric locomotives of the Swiss Federal Railways had covered an aggregate of 945,000 miles, equivalent to about 80,000 miles a year per locomotive. Designed for hauling passenger trains up to 770 tons weight and freight trains of 1,500 tons over the St. Gotthard route, each of these locomotives is of the 1-Bo-1-Bo-1+1-Bo-1-Bo-1 wheel arrangement.

**More Swiss Electrification.**—The line from Le Day to Le Brassus, close to Vallorbe and located parallel to the French frontier, has been electrified on the standard 15-kV. 16⅔-cycle single-phase system from the junction with the Vallorbe-Lausanne main line at Le Day. The

line belongs to the Swiss Federal Railways as far as Le Pont, 5½ miles, and thence to Le Brassus, 8¼ miles along the shores of the Lac de Joux, is the property of a private company.

**Thames Delays London Trains.**—An unusually low tide on the Thames on December 5 caused a quantity of mud from the river to be washed into the cooling water inlets at Lots Road power station, which generates current for the London Passenger Transport Board's underground trains. Instructions were given that trains must reduce speed temporarily, so that the turbo-alternator sets could be worked at reduced load until the inlets were cleared, which took about 20 min.

**Soviet Underground Engineering School.**—The All-Union Transport Academy of U.S.S.R. has founded a new faculty—the faculty of underground railway and tunnel building. Hitherto students in this branch of engineering were trained at the Industrial Academy. While the theoretical course of the students in the new faculty will be given at the Academy itself, practical work will be done on the third section of the Moscow Metro, under construction, and in the mines of the Doubass and Kussbass.

**Paris Electrification Requests.**—Public opinion in certain areas of Paris is pressing for the conversion of the remaining steam-worked suburban lines out of the Gare St. Lazare—from Paris to Pontoise and Mantes *via* Achères and Argenteuil—and for the introduction of a regular and direct electric service between St. Lazare and Pontoise, *via* Argenteuil, Sannois, and Cernay. The Association of Passengers of the Nord Suburban Lines is also pressing for the electrification of the lines formed by the triangle Paris-Pontoise-Beaumont, comprising the routes Paris (Nord)-Pontoise, Pontoise-Persan Beaumont, Epinay-Persan Beaumont, Erman-Valmondois, and Montsoult-Luzarches. All these lines carry a heavy local and suburban traffic.

## RECENT ELECTRIC TRACTION DEVELOPMENTS IN ITALY

**P**RACTICALLY the whole of the electrification activity of the Italian State Railways in recent years has been concentrated on the 3,000-volt d.c. system, although in 1936-37 one or two short lines to the north-west of Genoa, such as the Ovada-Acqui-Asti, were converted to the standard 3,700-volt 16 $\frac{2}{3}$ -cycle three-phase current in order to improve locomotive and train operation in the area.

On November 14 last, two big 3,000-volt d.c. electrification schemes came to fruition, viz., the Milan—Bologna—Ancona, 263 route miles, and the so-called Rome—Leghorn line, 225 route miles. Actually, the second scheme extends from Rome to Viareggio, the three-phase system between Leghorn and Viareggio having been re-

placed by high-tension d.c. Offshoots of the Milan—Ancona scheme are the Fidenza—Salsomaggiore branch and the Fidenza—Fornovo—Parma triangle. Continuous d.c. electric traction is now in operation between Milan and Reggio Calabria, a distance of 820 miles, and continuous three-phase and d.c. traction from Modena to Reggio Calabria, a distance of 910 miles. The d.c. system is gradually encroaching upon the southern limits of the three-phase system, and will doubtless eventually be extended up the Ligurian coast line from Viareggio to Genoa, and over the Spezia—Fornovo line. It is not improbable, too, that the celebrated Valtellina line will be converted to d.c., for it is an isolated three-phase section and ends at Monza, too close to Milan for convenient



Map of electrified lines belonging to or worked by the Italian State Railways

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Map of electrified private railways in Italy. The systems of electrification are d.c., single-phase and three-phase, as detailed in the table on the following page

working, particularly as Milan Centrale and its eastern and northern suburban approaches are now electrified on the high-tension d.c. system.

The other high-tension d.c. area is against the Yugoslav border, where the plentiful supply of water power from the Julian Alps helped to make conversion attractive. In this district the line from Trieste Campomarzio to Opicina was electrified last year, and conversion work is to proceed thence to Gorizia, giving an alternative electric route to that town and Udine from Trieste. As a rule, traffic in this area is operated by the E.626 class of Bo+Bo+Bo locomotives and by single-unit streamlined electric motorcoaches, sometimes by two coupled in multiple-unit, whereas on the Milan—Rome—Naples line the E.428 class of 2-Bo + Bo-2 locomotive is a favourite, with the E.326 2-Co-2 locomotives for the Foggia and

Reggio Calabria lines. From the end of this year it appears that some of the power for the Julian Alps lines will be supplied from the new underground hydro-electric plant in the Isonzo valley, which is to be opened this month.

Among other work undertaken in recent years has been the conversion from low-tension to high-tension d.c. of the State Railways' suburban lines from Milan to Gallarate on the Porto Ceresio line, first electrified in 1901-02, and of the Naples—Villa Literno line, first electrified in 1925-27. The Nord Milano Railway, which had electrified its Milan—Saronno and Bovisio—Meda lines in 1929, and prolonged electric working on the former as far as Como in 1937, has been taken over by the State, and this has meant the addition of a further 40 route miles of high-tension d.c. to the State system. The only remaining

low-tension d.c. lines connected with the State Railways are the Trento—Male and Brunico—Campo Tures, both of which are worked on behalf of private companies, and the Gallarate—Porto Ceresio section between Milan and the lakes.

The Milan—Bologna—Ancona line is fed with power generated by low pressure natural steam from the borax mines at Lardarello, near Pisa, and in the power station at that place are four 12,000-kW. turbo-alternator sets. There are 11 mercury-arc rectifier substations along the line, with a total installed capacity of 22,000 kW. on the continuous rating. Over 600 miles of 134-kV. three-phase transmission lines have been erected for the Milan—Ancona route, but like the 325 miles necessary for the supply of the Rome—Viareggio route, this e.h.t. network is to form part of the Italian grid. The Rome—Viareggio section is fed through nine rectifier substations with a nominal installed capacity of 18,000 kW. On the Milan—Ancona

## ELECTRIFIED PRIVATE LINES IN ITALY

	Route	Gauge	Current
	km.	mm.	
Valli di Lanzo (Turin-Ceres)	42.5	1,435	d.c. 3,600 V.
Biella-Andorno-Balma	12.7	950	d.c. 2,400 V.
Biella-Cossato-Vallemosso	20.0	950	d.c. 2,400 V.
Biella-Novara*	54.0	950	d.c. 2,400 V.
Cossato-Masserano	6.5	950	d.c. 2,400 V.
Centovalli (Italian portion)	32.2	1,000	d.c. 1,200 V.
Varese-Ponte Tresa	46.8	1,000	d.c. 600 V.
Intra-Premeno	13.3	1,000	d.c. 1,350 V.
Trepani-Torino	18.0	1,435	d.c. 1,200 V.
Voghera-Varzi	32.4	1,435	d.c. 3,000 V.
Bolzano-Collalbo	11.7	1,000	d.c. 750 V.
Dermulo-Fondo-Mendola	23.7	1,000	d.c. 800 V.
Calzo-Dobbiate	65.0	950	d.c. 2,800 V.
Bolzano-Caldaro-S. Antonio	17.1	1,435	d.c. 1,200 V.
Ora-Predazzo	51.7	1,000	d.c. 2,400 V.
Agordo-Bribano	28.5	1,435	d.c. 2,000 V.
Genoa-Casella	23.6	950	d.c. 2,400 V.
Emiliana (Modena area)	115.0	1,435	d.c. 3,000 V.
Rimini-S. Marino	32.0	950	d.c. 2,400 V.
Pisa-Calambrone	21.5	1,435	d.c. 3,000 V.
Pracchia-S. Marcello-Mammiano	16.7	950	d.c. 1,200 V.
Castel Raimondo-Camerino	11.5	1,000	d.c. 600 V.
Spoletto-Norcia	51.0	950	d.c. 2,400 V.
Arezzo-Sinalunga	39.5	1,435	d.c. 2,800 V.
Porto S. Giorgio-Amandola	59.3	950	d.c. 2,400 V.
Rome-Viterbo	105.0	1,435	d.c. 3,000 V.
Rome-Ostia-Lido	24.7	1,435	d.c. 2,400 V.
Chieti Town-Chieti Stn.	8.7	1,000	d.c. 750 V.
Sangritana	150.0	950	d.c. 2,400 V.
Agnone-Pescocostanzo	37.5	950	d.c. 1,200 V.
Circumvesuviana	69.0	950	d.c. 1,000 V.
Pugliano Funicular	7.7	1,000	d.c. 550 V.
Penne-Pescara	36.5	950	d.c. 2,400 V.
Naples-Pozzuoli-Torregaveta	19.7	1,435	d.c. 1,200 V.
S. Severo-Peschici	78.7	1,435	d.c. 3,000 V.
S. Spirito-Bitonto	8.1	1,435	d.c. 1,350 V.
Central Umbrian (Umbertide-Terni-P. S. Giovanni-Perugia)	112.7	1,435	1/25 11 kV.
Bergamo-S. Martino di Calvi	40.6	1,435	1/24 6 kV.
Naples-Capua	39.8	1,000	1/25 11 kV.
Sondrio-Tirano	34.0	1,435	3/16 3-7 kV.
Total	1,618.9		

\* Still under construction

feeder system the e.h.t. cables are carried across the River Po with a span of 2,600 ft. between two towers 230 ft. high.

Conversion schemes now in hand include the Milan Centrale—Chiasso and Milan (Rogoredo)—Voghera lines, both of which are scheduled for completion by the end of October, 1939. At Voghera this 3,000-volt d.c. system will join the three-phase lines, and both here and at Viareggio a neutral section is introduced between the two types of current, over which the incoming electric locomotive coasts with lowered pantographs. It is then shunted off either by an electric locomotive of the other system, or by a steam locomotive. Coincident with conversion, the Milan—Chiasso line is being remodelled and resigalled to suit it for higher operating speeds. The Domodossola line is being doubled, and when this work is finished, 3,000-volt d.c. electrification will be extended from Gallarate to Domodossola, where the Swiss 15-kV. single-phase system is joined. The high-tension d.c. has not yet been carried all the way to Porto Ceresio, and certain low-tension d.c. electric trains beginning at Milan

## 3,000-VOLT D.C. ELECTRIFIED LINES, ITALIAN STATE RAILWAYS

	Route km.	Approx. track km.
Milan-Bologna-Ancona	423	1,050
Fidenza-Salsomaggiore	10	12
Fidenza-Fornovo-Parma	48	90
Bologna-Florence (Direttissima)	97	215
Florence-Chiusi-Rome Termini	316	720
Rome-Naples (Mergellina, P. Garibaldi)	214	455
Naples C.-Reggio Calabria	474	800
Milan-Porto Ceresio*	72	146
Milan-Como, Bovis-Meda†	65	135
Bologna (Panigale)-Pistoia-Prato‡	112	200
Rome-Avezzano-Sulmona§	170	230
Campoleone-Nettuno	26	30
Villa Literno-Naples C.	33	75
Aversa-Foggia	178	275
Codola-Nocera Inf.	4	5
Torre Annunziata-Gragnano	10	11
Rome (Termini)-Grosseto-Viareggio	358	800
Pontegale-Fiumicino	11	12
Postumia-S. Pietro	13	30
Trieste-Aurisina-S. Pietro-Fiume	129	260
Aurisina-Bivio d'Aurisina	3	6
Bivio d'Aurisina-Cervignano	31	70
Monfalcone-Gorizia-Udine-Tarvisio	151	275
Trieste (Campomario)-Opicina	16	20
Aosta-Pré St. Didier	31	36
Totals	2,995	5,948

## LOW-TENSION D.C. LINES

	Route km.	Approx. track km.
Campo Tures-Brunico	15	18
Trento-Malé	59	64
Totals	74	82

\* Converted from l.t. to h.t. direct current; work not yet complete

† Ex-Nord Milano lines

‡ Converted from 3-ph. 3,700 volts 16-6 cycles

§ Converted from 3-ph. 10,000 volts 45 cycles

Centrale are hauled by an h.t. electric locomotive from that station to Gallarate or Varese, and run thence to Porto Ceresio over the original third rail system.

Next on the conversion list to the Chiasso and Domodossola lines is an extension in the Venetian area, which will eventually join the Milan—Naples backbone of the 3,000-volt d.c. system to the isolated Julian Alps lines through the Cervignano—Mestre—Padua—Bologna route. Completion of this electrification is reported to be scheduled for the end of 1941, by which time it is expected conversion of the Turin—Milan—Padua and Bologna—Verona—Trento lines will be under way. Another contemplated conversion is from Ancona to Orte, on the Florence—Rome main line. When the above schemes are completed it is estimated that a saving of over 2,500,000 tons of coal a year will accrue from the whole State Railways electrified system. Private railways are still giving consideration to electrification, particularly for new lines, such as the Biella—Novara route, which is scheduled for opening throughout during 1939. The Emiliana system, centred on Modena, has also been extending its electric system and stock.

## 3,700-VOLT 3-PHASE 16-6-CYCLE ELECTRIFIED LINES, ITALIAN STATE RAILWAYS

	Route km.	Approx. track km.
Modane-Turin (P.N.)	106	260
Turin-Alessandria-Ronco-Genoa (P.P.)	170	547
Novi-Tortona	20	32
Arquata-Tortona	25	32
Alessandria-Voghera	38	94
Asti-Acqui-Sampierdarena	101	125
Ovada-Alessandria	34	40
Alessandria-Acqui-S. Giuseppe di Cairo	84	92
Trofarello-Carmagnola-Bastia-Ceva-Savona	133	250
Carmagnola-Fossano-Cuneo-Ventimiglia*	148	178
Fossano-Ceva	39	80
Cuneo Junction lines	13	29
Sampierdarena-Ventimiglia	148	220
Trofarello-Chieri	9	10
Bussoleno-Susa	8	9
Genoa Harbour	22	34
Genoa (P.P.)-Viareggio	143	345
Vezzano-Fornovo; S. Stefano-Sarzana	96	115
Chiavenna-Colico-Lecco-Monza; Colico-Sondrio	145	192
Brennero-Bolzano-Trento	147	354
Bolzano-Merano	31	35
Second Giovi route	22	70
Turin (Biv. Sangone)-Torre Pellice	48	60
Bricherasio-Barge	12	15
Totals	1,742	3,229

\* Not including 3-ph. Piana-S. Dalmazzo di Tenna section belonging to French National Railways